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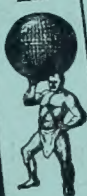
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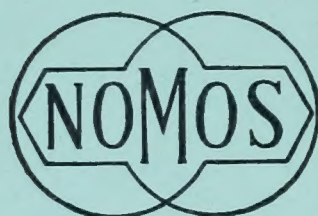
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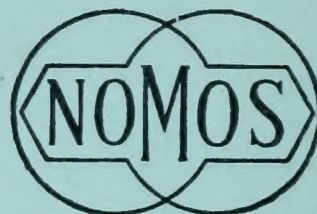
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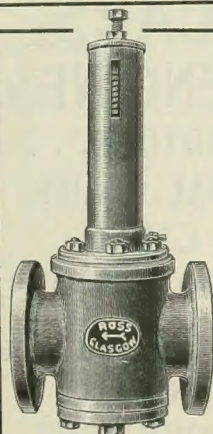
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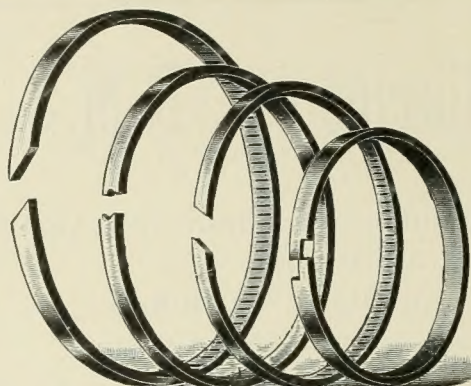
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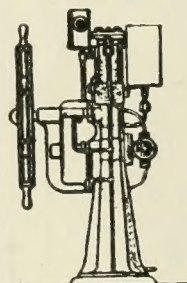
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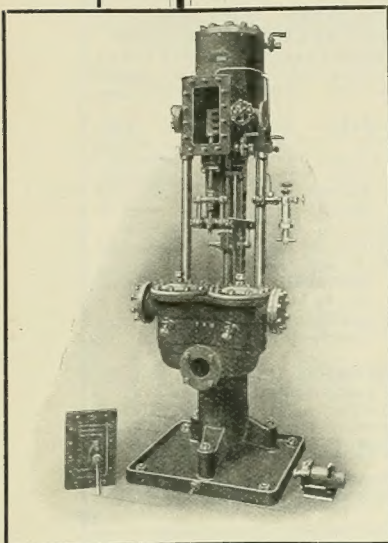
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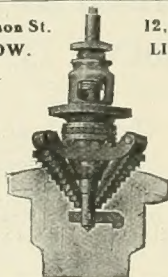
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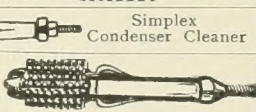


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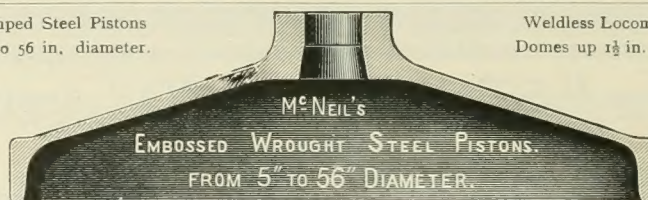
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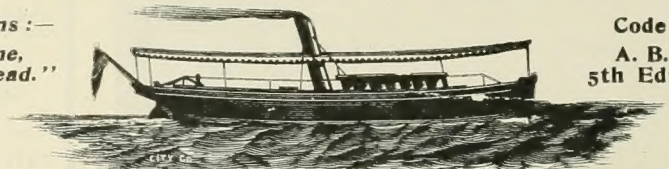
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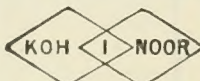
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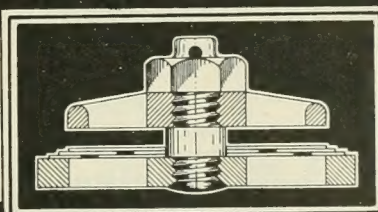
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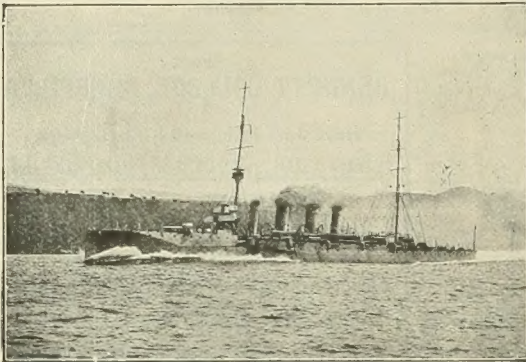
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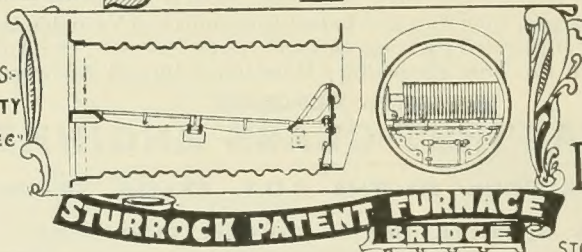
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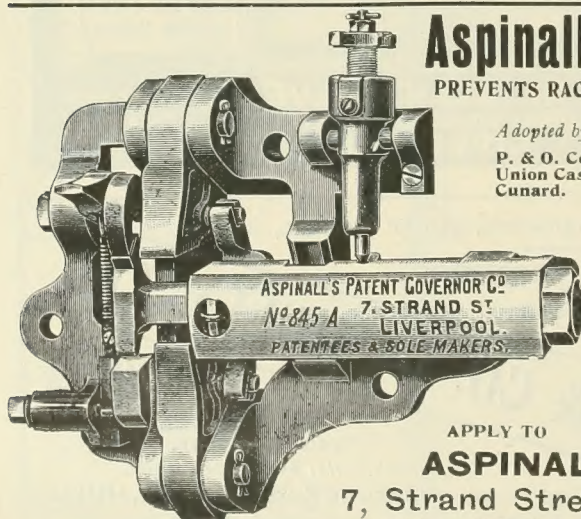
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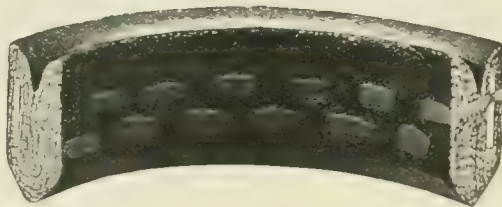
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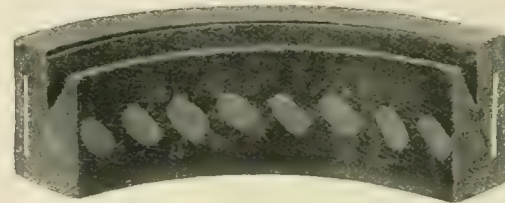


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The Marine Engineer

And Naval Architect.

LONDON, OCTOBER, 1914.

THE WAR AND SHIPPING

JUST as we were going to press with our last issue, an Order in Council was issued notifying the fact of the adoption of the Declaration of London, subject to certain additions and modifications by the British Government. The additions and modifications comprise the following matter: The lists of absolute and conditional contraband contained in the proclamation dated August 4th, 1914, are substituted for the lists contained in Articles 22 and 24 of the said Declaration. A neutral ship which succeeded in carrying contraband to the enemy with false papers, may be detained for having carried such contraband if she is encountered before she has completed her return voyage. The destination referred to in Article 33 may be inferred from any sufficient evidence, and shall be presumed to exist if the goods are consigned to or for an agent of the enemy State, or to or for a merchant or other person under the control of the Authorities of the enemy State. The existence of a blockade shall be presumed to be known to all ships which sailed from or touched an enemy port a sufficient time after the notification of the blockade to the local authorities to have enabled the enemy Government to make known the existence of the blockade; and to all ships which sailed from or touched at a British or allied port after the declaration of blockade. Notwithstanding the provisions of Article 35 of the Declaration, conditional contraband, if shown to have the destination referred to in Article 33, is liable to capture to whatever port the vessel is bound, and at whatever port the cargo is to be discharged. The general report of the drafting committee on the Declaration, presented to the naval conference and adopted by the conference at the eleventh plenary meeting on February 25th, 1909, shall be considered by all prize courts as an authoritative statement of the meaning and intention of the Declaration, and such courts shall construe and interpret the provisions of the Declaration by the light of the commentary given therein. Lastly, the authorities are set out as to the giving of the necessary directions to the respective departments that they control. It will be recognised that Great Britain, in her anxiety to adopt the same rules as her allies, has adopted, as a temporary expedient, the principles of the Declaration of London, with modifications which render the original almost unrecognisable. As a matter of fact neither our allies nor ourselves are actually bound to observe it at all, for Article 66 makes it only applicable in the case of a war in which all the belligerents are adherents to its terms, and in the present case this does not obtain. Not having ratified the Declaration, we are certainly at liberty to introduce any modifications which we think desirable to meet the present circumstances. It has been contended that the merit of the Declaration was its definition of what was or might be contraband.

It was recognised that the definite sanctioning of the new practice of confiscating innocent goods without paying for them, whenever their destination appeared suspicious to a suspicious prize court was a matter of trifling importance. Contraband, as thus defined, can be divided into two classes: There is the "absolute" contraband, consisting of articles of obvious immediate use for warlike purposes, which class is left as originally defined, with the addition of aircraft and their accessories. The second class was "occasional" contraband, which used to be taken and paid for under highly unusual circumstances, and against the constant protests of the continent. It will be remembered that this, under the Declaration, was to be confiscated with the vessel if such cargo formed more than half that of the vessel. This step, to be carried out legally, would appear to have necessitated new legislation, as the present law gives the neutral owners the right to receive compensation for the cargo and to have the vessel restored with payment of freight for its services. It will be generally agreed that it is not to the interests of the nation, and at the same time undesirable, to harass neutrals, who are engaged in the transport of innocent cargo; it may be wise to buy it if it appears destined for the enemy's forces, but it cannot be wise, or even ultimately safe, to confiscate it or the ship. On examination, it will be found that the proclamation reverses the rule of the Declaration, that innocent goods are free from seizure as contraband, if for a neutral port, whatever suspicion may exist that they are going on to the enemy's forces; for example, it interferes with the export of food and many other articles to Holland and Sweden. Further, it adds to the presumptions that such goods are destined for the enemy's armed forces, arising from their being consigned to enemy authorities or "contractors," the further presumption arising from the fact of consignment to an agent of the enemy State, or a merchant or person under the control of the enemy State. From this it follows that since everybody in the enemy's territory is under that control, the presumption amounts to forbidding all trade in conditional, as well as in absolute contraband, with the enemy's port, in fact to institute a paper blockade. The old rule, admitting the capture of vessels which have carried absolute contraband with false papers, is re-instated and applied also to conditional contraband. The rules regarding notice of blockade as set out in the Declaration are supplemented by the proclamation. The Declaration only deals with the notice which a ship is presumed to have if she sailed from or touched at a neutral port whose Sovereign has been previously notified of the blockade. The cases where she touches at or sails from a British, allied or hostile port are not dealt with. A similar presumption is now established if, in the case of a British or allied port, a declaration of the blockade had been "published," and if, in the case of a hostile port it had been made known to the authorities of the blockaded port in time to enable the enemy to notify it publicly. These presumptions are capable of being rebutted by evidence, and are therefore not considered of importance, in fact, it may be said that it would be seldom that a voyage to a blockaded port from a British port would not constitute an act of trading with the enemy. To sum up the matter in short, it

may be said that the modifications, so far as important, amount to the sustaining of the doctrine of continuous voyage, and to condemn to the severest penalties, the carriage of innocent goods to practically any consignee in the enemy's country. It will be recognised that the determined opposition to the Declaration of London as originally drafted, pursued by the Chambers of Commerce and other Associations was fully justified, and has borne out the justice of the trenchant criticism passed on it at the time. By the light of subsequent events, it is a very lucky thing that the House of Lords threw out the Bill for the ratification of the Declaration as originally put forward.

THE NATIONAL RELIEF FUND.

At the time of going to press the fund had reached a total of £2,842,000.



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CLEANING HULLS OF SHIPS.

WE are informed that the Admiralty has taken up the use of the Submarine Motor Ship Cleaner, which was described and illustrated in our April issue. It will be remembered that, by using this invention, hulls of ships can be cleaned without dry docking, which of course means a saving in cost and time. Warships can be cleaned in six to seven hours as they remain at anchor in the water.

ENGINEERS AND THE WAR.

AS the result of a consideration of the great war now raging in Europe the Office-bearers and members of Council of the Institute of Marine Engineers have had a communication sent to the Secretary of the Admiralty, on behalf of the members of the Institute, offering their services to the Admiralty, to advance in any way the operations against the enemy. The Lords Commissioners of the Admiralty have replied expressing their thanks for the offer of service. Several members of the Institute having written volunteering their services as reserve engineers for the Royal Navy, the Admiralty advise that such applications should be made to the Secretary of the Admiralty, Whitehall, London, S.W., each applicant stating his qualifications, experience, where trained, age, etc.

THE FLEETS OF THE MAIL LINES.

(From our Own Correspondent.)

The Fleets and the War.

AS might be well expected there is nothing passing in regard to shipping matters which is not directly concerned with the war. The Fleet of Britain still maintains its hold on the front door of the German Navy, and that being so our commerce continues its activity almost in its normal way, whilst the ships of the German Empire are practically driven from the face of the seas. Last month a list was given of the more important mail and passenger steamships which had been compelled to take refuge in New York, and, in passing, it should be mentioned that the scheme for transferring them to the American register seems, at all events for the moment, to have fallen through. The sale could hardly have been regarded with equanimity by France and Britain, for it would have greatly strengthened the important steamship companies of Germany. At present the ships are a *damnum hereditas* to their owners. They must be insured, and have their dues paid; interest and depreciation are constantly accruing, whilst their crews cannot apparently be discharged in New York, and so the food and wages bills are running on, and making a pretty item on the debit side of the account. Sale to the United States would have put a stop to all these outgoings, and might have given the companies the four millions sterling at which they valued the vessels. Even if, in deference to the feelings and rights of the Allies, payment of this money had been held over, the relief from current expenses would have remained, and the promise to pay at the end of the war would have had a present value upon which no doubt financiers would have made advances. So it is quite the best that the negotiations should be allowed to drop.

In addition to the ships lying at New York it is said that there are no less than forty-three German vessels in shelter at Rotterdam. This fact seems perhaps the greatest tribute to the efficiency of the British strangulation of Germany's commerce. Rotterdam is, as it were, next door to the line of German ports in the North Sea, and yet for nearly two months not one of these ships has dared to show its nose outside the port of Rotterdam and trust to luck to make a bolt for home. And what is going on at Antwerp and New York is taking place at almost every port in the world. Australia, the Cape, Colombo, Bombay, the Straits Settlements, Hong Kong, Rangoon, Calcutta, Gibraltar, Malta and Quebec amongst British ports overseas, all have their quota, which, in due course, will find their way into British Prize Courts. The neutral ports all over the world have also been sought as places of refuge where the warships of France, Japan and Britain are powerless to seek out their quarries, and in truth and in fact the commercial flag of Germany is driven from the ocean. Herr Ballin, who aimed at the commercial sovereignty of the seas, now cherishes the pitiful hope that he may be able to employ some of the tonnage of the Hamburg-American line in the Baltic. Comment on this would only blunt the point of the bald statement of fact.

The German war flag is, however, still apparent, somewhere. Five Imperial cruisers are said to be hunting British and French merchantmen in the Atlantic, and a like number are free on the Pacific. The Atlantic detachment has some five-and-twenty vessels looking for them, whilst the Commonwealth Navies, and certain Japanese cruisers are also joining in the hunt in Pacific waters.

Kaiser Wilhelm Der Grosse.

Germany is not without some gallant men in the Imperial Navy, and one of them was assuredly the gentleman—his name had not been disclosed—who commanded the *Kaiser Wilhelm der Grosse* during her brief career as a commerce destroyer. This vessel was fitted out as an auxiliary merchant cruiser at Bremen at or before the outbreak of war, being armed with four-inch guns. She made her way into the Atlantic round the North of Scotland, capturing and destroying the steam trawler *Tubal Cain* as she passed to the South of Iceland. Once in the Atlantic she took up her position in the neighbourhood of the Canary Islands, and

soon picked up the Royal Mail Steam Packet Company's *Arlanza*. Her she did not capture, as, of course, she had no port into which she could take her, and considerations of humanity forbade the sinking of a great passenger vessel. So she contented herself in this instance with making her throw important parts of her wireless installation overboard. Not long afterwards the Union Castle intermediate liner *Galician* had a similar experience. In her case it was specifically stated that she was spared because of the women and children on board. Then came the encounter with the New Zealand Shipping Company's twin-screw liner *Kaipara*, homeward bound from Lyttleton with 72,000 carcasses of mutton, and a valuable consignment of wool. This ship was sunk, the crew being first removed. Next she met the Elder Dempster liner *Nyanga*, also with a valuable cargo, this time of West African produce. She fared in the same fashion as the *Kaipara* had done. But the end was coming. Off the port of Rio Cro the big steamer was to fill up her bunkers from four attendant colliers—the *Bethania* of the Hamburg-American Line, the *Magdeburg* of the Nord Deutscher Lloyd, the *Arucas* and the *Duala*, the latter being painted to simulate the appearance of a Union Castle Liner. Suddenly an alarm was raised. A British warship was in sight! The prisoners were rapidly transferred to the colliers, and the *Kaiser* prepared to make a stand. She ought to have done some good in the fight—on paper. For her antagonist was a small and old cruiser, the *Highflyer*, of a once legend speed of 20 knots, whilst the big German was at least three knots faster. The contest, however, proved a very one-sided affair—the *Highflyer* sending her to the bottom with little trouble. She managed, too, in the course of the engagement to put an ugly shot into the *Magdeburg*. But at that time the destruction of the modern *Alabama* was a sufficiently satisfactory ending to the *Highflyer's* adventure. A little later, however, came the report that a British warship had taken the *Bethania* into Kingston, Jamaica. This vessel was a valuable prize in herself, being a modern steamship of nearly 8,000 tons, fitted with twin-screws. She carried a large number of German sailors, and, above all, a great supply of coal, which, under other circumstances, might have been very useful to the German raiders.

British Merchantmen Sunk.

Another loss to the fleets of the big British Companies was that of the *Hyades*, sunk by the warship *Dresden* off the port of Pernambuco. This loss is interesting, inasmuch as, if memory serves me, the *Hyades* had played a useful part as a transport in the South African campaign. But she is now an old ship, and, if report speaks truly, the loss of her cargo will not be a very severe blow to British Commerce as it is said to have been shipped on German account. Another and more serious loss was that of the new City liner, the *City of Winchester*, sunk by a sister to the *Dresden*, in the Indian Ocean. There have also been half a dozen losses of merchant ships in the Bay of Bengal. The fast cruiser *Emden* of the German "Town" class, the type of cruiser which has done all the commerce destruction of the war so far, disappeared for some six weeks and then suddenly, about the 10th September, appeared in the Bay of Bengal, not far from the mouth of the Hooghly. She was thus quite unexpected by those whom she sought as her prey, and fell into a stream of traffic. On the 10th September she met the London steamship *Indus*, owned by Mr. J. Nourse. This vessel was hailed at 9 a.m., by a little after one o'clock she was abandoned by her crew, who were taken aboard the attacker and by half-past four the merchantman was sunk. This was a vessel of some 3,300 tons, built in 1904 at Glasgow by Messrs. C. Connell & Co. A larger vessel was the *Lovat*, of Leith, owned by Mr. J. Warrack. She was of over 5,300 tons, built but three years ago at Port Glasgow by Messrs. Russell & Co. This vessel's crew were put aboard the Hamburg-American Co.'s steamship *Markomannia*, which was acting as a collier to the *Emden*. Early on the morning of the 13th the steamship *Killin* was sighted by the *Emden*, and her crew being transferred to the British steamer *Kabinga*, the *Killin* in her turn was sent to the bottom. She was another Connell-built ship and was of 3,544 tons gross register, constructed six years ago. Later in the same day the most valuable prize of all was encountered. This was the Liverpool steamship *Diplomat* of 7,615 tons. She too was built by Messrs. Connell,

having been launched but two years ago. She is said to have been carrying some four million pounds of tea. In her case the work of destruction was accomplished by the use of a mine which was exploded under her bows. The *Traboch* was the last of the quintet to suffer. She was a four thousand-ton vessel built in 1910 by Messrs. A. McMillan and Co., of Dumbarton. All this seems to have taken place quite close to the entrance to the river, and other vessels might have been caught but for a warning conveyed to the Ellerman Line *City of Rangoon* by a gallant Italian sailor man, who put his sense of humanity before his obedience to the duty of strict neutrality. All the crews of the unfortunate vessels having been transferred to the *Kabinga*, the latter was allowed to proceed, and she went into Calcutta with her crowded decks and the news of what had taken place. Meanwhile the *Emden*, with her attendants—for by this time she had taken on a Greek steamship as an additional collier—went over to Rangoon, where she sank the Glasgow steamship *Clan Matheson*, and then tried to get away, feeling no doubt that the neighbourhood would soon be made too hot for her. On the other side of the world the famous Cunarder *Carmania*—the last time she lay alongside a German was when conducting the rescue of the survivors of the *Volturmo*—was engaged in fighting a German armed cruiser of her own size off the East Coast of South America. It was not at first clear whether her opponent was the Hamburg South American liner *Cap Trafalgar* or the *Berlin* of the Nord Deutscher Lloyd. The former of these vessels was, of course, built for the mail and passenger service to the Plate, coming out last year when she was by far the biggest vessel engaged in her trade. The *Berlin* is of something under 18,000 tons and is six years old. Either of these vessels was a worthy opponent for the big Cunarder. The duel lasted an hour and three-quarters, and at the end of that time the German turned turtle and went down, her survivors being rescued by a collier which was standing by. The Admiralty sent a message "Well done, *Carmania*," and well done it was! This action is the first of its kind in the present war. We have had the sinking of a mine-layer by a division of destroyers; the successful engagement of torpedo boats and cruisers off Heligoland and the sinking of a number of valuable ships by the deadly mine and submarine. But the single ship action in which the *Carmania* came off victorious reminds one of the brave old days when seamanship and determination spelt victory. This sinking of British merchantmen is another instance of the cynical disregard of the enemy for what he is pleased to term "scraps of paper." By the Conventions to which Germany has put her name, it is forbidden to a belligerent to sink a merchant ship at sea, save in cases where, owing either to the unseaworthiness of the captured ship or the insufficiency of the captor's own crew, it is impossible to take the prize into port.

State Insurance.

The Government, which has of course the best knowledge on the subject, evidently regards these raids on our commerce as trivial matters since it has now reduced the rate for the State Insurance of war risks from three guineas to two, and moreover has extended the benefits of its scheme not only to British trawlers but also to the vessels of the Belgian Mercantile Marine. In view of the way in which the coal supply of the raiders is being wiped up, it cannot in the nature of things be long before the activity of these vessels of prey will be curtailed by the active cruisers of the British Fleet.

White Star Oceanic.

The Service and the travelling public sustained a great loss when the *Oceanic* of the White Star Line ran on the rocks off the West Coast of Scotland and became a total loss. The circumstances under which this vessel went ashore have not yet been disclosed. But it is not difficult to imagine how she was lost—a deep draught vessel navigating those dangerous waters at a time when all aids to navigation in the way of lights and buoys have very properly for the safety of the country been removed. Happily there was no loss of life, the large complement of the ship being safely transferred to other cruisers by the efforts of the skipper and crew of the steam trawler *Glenochil*, which made several trips to remove everybody. She indeed after the ship was abandoned, succeeded in salvaging some of the more valuable property aboard her. The *Oceanic* was of course the first of the big ships

which have characterized the Atlantic trade in recent years. Coming from the stocks in the year 1899, as she did, she was the first vessel to overtop Brunel's *Great Eastern* of over forty years previous in gross tonnage, or rather in actual size. A favourite ship always she maintained her speed and her reputation to the end. It is but a couple of issues ago that I remarked on the delights of a visit to her. Many of those who have served or travelled in her will be sorry to hear she is gone. But even the late Mr. Ismay, who devoted so much thought to her inception, could not have wished her a better fate than to be wrecked in the country's service when standing out for truth, justice and liberty.

Changing of Ships' Names.

One minor effect of the war has been a great changing of names. Abroad we see the Allies striking out such inscriptions as *Rue de Berlin* and substituting titles of honour such as *Rue de Liege*. At home the Union Castle Company has made a move in a similar direction by the announcement that the two well-known intermediate steamships of their line, the *German* and the *Galician*, will in future be known as the *Glengorm Castle* and the *Glenart Castle* respectively. So the number of the old Union Line's famous G ships, by the united effects of sale and change of name, is quickly diminishing.

The Naval Prize Court

in London, vacation notwithstanding, has now got to work. In its three sittings it has to some extent settled the law, as altered since the last great war, by the united effects of the declarations of Paris and of London and of the various Conventions to which Britain has been a party. Briefly it has been held, that unless she takes some step to bring her practice into line with other nations in this regard Germany will not be able to claim for her ships the benefit of the Article which lays it down that ships leaving port before the beginning of the war are entitled to be released from capture. This point, though prominent in many of the cases at the earlier sittings, will of course arise less frequently as the war progresses. Another and even more important decision was that which dealt with the claims of neutral mortgagees. It was asked that, when an enemy ship is declared a good and lawful prize, their rights should be recognised and the debt due to them be paid over as a first charge upon the proceeds. In an exhaustive judgment the President of the Court showed how in the old days no such contention found favour with the great exponents of International Law. Mortgages of ships were not in those days as universal as they seem to be to-day—bottomry bonds being more frequently before the courts. But cases in which mortgagees put forward similar claims to those now advanced were undoubtedly considered in those days, and, then as now, unhesitatingly rejected. There are many reasons both of law and of expediency why that should be, and it is not likely that any superior Court will, in the event of an Appeal, arrive at any other decision.

NAVAL EXPENDITURE.

The usual return of the naval expenditure of the eight principal naval powers, gives the following gross figures:—

	1914-15.	1913-14.	1912-13.
Great Britain	£52,261,703	£49,625,636	£45,560,213
Germany	... 23,284,531	23,030,633	22,215,000
France...	... 25,387,306	21,292,422	19,072,945
Russia...	... 26,149,294	25,392,784	17,681,213
Italy	... 10,313,009	13,333,762	10,954,505
Austria-Hungary	7,408,106	11,222,123	
U.S.A. ...	... 30,331,364	29,482,991	25,902,577
Japan ...	... 10,023,919	9,938,433	9,533,997

BRITISH CRUISERS TORPEDOED.

EARLY in the morning of the 22nd of September German submarines in the North Sea succeeded in torpedoing three British armoured cruisers of a comparatively old type. The loss of life is very considerable, amounting, it is estimated, to half the ships' crews, but the exact figures were not known at the time of going to press, as the complete lists of casualties were not prepared. The lost vessels are the *Aboukir*, *Hogue* and *Cressy*, and they formed part of a group of six vessels known as the "Cressy" class. The remaining vessels of the class are *Sutlej*, *Bacchante* and *Euryalus*. The *Aboukir* was first torpedoed, and whilst the *Hogue* and *Cressy* had closed and were standing by, assisting to save the crew of that vessel, they were also torpedoed. Thus the two latter vessels offered practically stationary targets to the attacking submarines, and were fairly easy prey. The *Cressy* and *Aboukir* were built by the Fairfield Company, the former being completed in 1901 and the latter in 1902. The *Hogue* was built by Vickers' Co., and completed in 1902. The general particulars of the class are: Length 454 feet, beam 69½ feet, draught 28 feet, displacement 12,000 tons. The designed h.p. was 21,000, with a speed of 21 knots, reduced to about 18 knots in later days. The armament consists of two 9·2-inch, twelve 6-inch and smaller guns. Each vessel cost complete about £800,000, and carried a complement of 700 men.

METAL JOINTING.

AT the Institute of Marine Engineers on September 21st, a demonstration was given of the Amalgaline system of Metal Jointing, by Mr. Harden, the inventor of the process.

Before giving the demonstration, Mr. Harden read a short paper in which he stated that the process effected a complete fusion between the surfaces joined. In marine work, the principal uses to which the system is applied are the flanging of pipes, the seaming of lead used in refrigerating chambers and general sanitary work. The system of flanging was first adopted by Messrs. Doxford, of Sunderland, and the process is now in general use among shipbuilders on the Clyde, the Tyne, the Tees and the Wear. The system is not confined to the use of small pipes, but is used in an ordinary way on pipes varying in bore from 3 in. to 9 in. Like lead burning, it is an auto-genous process, but instead of using an intense local heat the fusion is effected by the action of the amalgaline on the surfaces it is in contact with, forming an amalgamation between the lead of the flange and the lead pipe.

The material used is in the form of a metallic ribbon .002 in. in thickness, practically a pure metal, which, when placed between the surfaces of lead and subjected to heat, fuses at a temperature of 160°—lower than the actual fusing point of lead—and in fusing, it causes the lead surfaces to run together at a lower melting point than that of the body of the lead. This running together has an autogenous effect, and by intermolecular absorption, the minute particles of amalgaline are dissipated into the body of the lead, which, by reason of the absorption becomes stronger at the junction than elsewhere. Demonstrations of flanging and various other uses of the process were given.

THE ENGINE ROOM HEROES' MEMORIAL.

BY the courtesy of the Committee of "The Engine Room Heroes' Memorial" and of Sir William Goscombe John, R.A., the Sculptor, we are able to publish a photographic reproduction of the model of the symbolic obelisk which is to be erected in Liverpool to the memory of the brave engineers and firemen who lost their lives in the *Titanic* disaster on April 15th, 1912.

The memorial is to be in grey granite, with the exception of the top portion, which will be in gilt metal. The total height will be 45 feet, the figures being seven feet six inches high.

The treatment adopted by the sculptor is symbolic rather than picturesque, this treatment being considered more suitable for such a memorial—the motive chosen being the contending natures of the two elements of fire and water, fire the impelling and water the resisting.

On two faces of the lower portion, or base, will be two groups, one of engineers and the other of firemen, holding tools characteristic of their office. One group is shown in the accompanying illustration.

On the angles of the upper portion of the base are four figures representing the elements of fire and water, encircled by designs of the ocean surrounding the world, with symbolic designs of flames rising above the horizon. This is surmounted by an obelisk, on the top of which are four figures rising out of the sea, representing the spirits of the ocean supporting a flaming torch, symbolic of the triumph of fire over water.

It is stated that the memorial will be unique in this country, being the only one of such dimensions carried out entirely in granite.

The site, which is being given by the Corporation of Liverpool, is an admirable one, situated near the landing stage where passengers to and from America land and depart.

The work, which is being carried out by Sir William Goscombe John, R.A., will be completed next year, and will be a fitting memorial to those brave men who died at their posts in the most appalling disaster in the history of shipping.

ENGINEERS' CLUB, MANCHESTER.

AT an extraordinary general meeting of the Engineers' Club, held September 8th, it was decided to form a "Pals" battalion for Kitchener's army, such battalion to be recruited from those engaged in the works and offices of engineering concerns. Every member of the Club is asked to induce his friends, staff and employees to join, and to send their names as quickly as possible to Mr. Hill, Hon. Sec. of the Club, at Albert Square, Manchester, with the following particulars:—Name in full, age, address, married or single, if married number of children under 16 years of age, occupation, name of employer, previous training (if any) in the forces of the Crown.

More than ten per cent. of the employees of Sir W. H. Bailey & Co., Ltd., Albion Works, Salford, Manchester, have enlisted in the Army and the Territorials for Active Service. The firm is paying 10/- per week to the dependents of each married man and is also subscribing to a fund, which has been created for the benefit of the dependents of the unmarried men by the remaining employees who are subscribing a percentage of their weekly wages.



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The Engine Room Heroes' Memorial,
Liverpool

CAPTURE OF ENEMY SHIPS.

THE following list of enemy merchant ships captured, supplements the names given in our September issue. The lists are in accordance with the revised list of captures issued by the Foreign Office and published in a supplement to the *London Gazette*. Tonnage, nationality and place of seizure are given.

Name & Tonnage.	Nationality	Where seized.
Adolf, 943.	Ger.	Gibraltar
Adolf, 120.	"	Leith
Alesia, 5,144.	"	Rangoon
Alfred, 130.	Aus.	London
Altair, 3,220.	Ger.	Granton
		Reported captured and taken in to Port Sudan
Altona, 4,312.	"	Melbourne
Angela, 122.	"	Grangemouth.
Apolda, 4,939.	"	Cape Town
Athene, 2,470.	"	Sydney, N.S.W.
Attila, 3,240.	Aus.	Kirkwall
Australia, 7,485.	Ger.	Colombo
Behrend, 141.	"	Arbroath
Bellas, 931.	"	Quebec
Berlin, 79.	"	Wick
Berlin, 4,196.	"	Sydney, N.S.W.
Birkenfels, 5,639.	"	Cape Town
Bolivar, 267.	"	Plymouth
Braunfels, 5,554.	"	Karachi
Brema, 1,537.	"	Swausea
Canstatt, 5,930.	"	Brisbane
Carl Rudger Vinnen	"	Newcastle, N.S.W.
2,903.	"	Straits Settlements
Chow Tai, 1,777.	"	Reported captured in Persian Gulf
Christian X., 4,956.	"	Seaham Harbour
Comet, 1,471.	"	Invercargordon
Conrad, 164.	"	
Daksa, 4,140.	Aus.	Gibraltar
Denebola, 1,481.	Ger.	West Hartlepool
Diana, 1,208.	"	Nigeria
Drei-Geschwister, 68.	"	Amble
Dryade, 1,831.	"	Warrington
Dr. Robitzsch, 202.	"	Aberdeen
Eduard, 476.	"	Liverpool
Elfreda, 1,860.	"	Bristol
Eise Kunkel, 218.	"	Aberdeen
Emanuel, 141.	"	Amble
Emir, 5,514.	"	Gibraltar
Erica, 141.	"	Fowey
Erymanthos, 2,934.	"	Malta
Erzherzog Franz Ferdinand, 6,105.	Aus.	Aden
Excelsior, 1,407.	Ger.	Castletown (Berehaven)
Fiducia, 123.	"	Yarmouth
Frankenfels, 5,854.	"	Calcutta
Franz Fischer, 970.	"	Sharpness Gloucester
Franz Horn, 1,314.	"	London
Freienfels, 5,633.	"	Calcutta
Frieda, 63.	"	Hull
Furth, 4,229.	"	Colombo
Gemma, 1,385.	"	Blyth
Genrueder, 73.	"	Alloa
Georg, 945.	"	Gibraltar
George Harper, 1,612.	"	Grimsby
Gerhard, 167.	"	Boston, Lines
Germania, 191.	"	Southampton
Germania, 1,096.	"	Sydney
Greifswald, 5,486.	"	Fremantle
Hamm, 4,598.	"	Cape Town
Hammel Warden, 87.	"	Aberdeen
Hanna Larsen, 1,310.	"	Southampton
Hans Hemsoth, 2,487.	"	Blyth
Hans Jost, 954.	"	Grangemouth
Henry Furst, 1,498.	"	Newcastle
Herbert Fischer, 938.	"	Poole
Hercules, 1,095.	"	Liverpool
Hermann, 65.	"	Dysart
Hessen, 5,099.	"	Melbourne
Hobart, 5,923.	"	Melbourne
Hochfeld, 3,889.	"	Reported captured near St. Vincent, C.V.
Hornsund, 3,643.	"	Manchester

Name & Tonnage.	Nationality.	Where seized.
Ida, 4,730.	Aus.	Quebec
Istria, 4,221.	Ger.	Reported captured and taken to Alexandria
Izrada, 3,539.	"	London
Joszeff Agost Foherczeg	"	
2,680.	Aus.	Ceylon
Karpat, 5,056.	"	South Shields
Kathanna, 126.	Ger.	Dysart
Kattenturm, 6,018.	"	Malta
Kostrena, 2,531.	Aus.	Weymouth
Kurmark, 5,137.	Ger.	Southampton
Lasca II., 357.	"	Calcutta
Leda, 6,766.	"	Bermuda
Levensau, 2,153.	"	Hull
Lina, 74.	"	Burntisland
Lindenfels, 5,476.	"	Aden
Lothringen, 5,002.	"	Melbourne
Lucida, 1,476.	"	Hull
Melbourne, 5,926.	"	Sydney, N.S.W.
Mientje, 120.	"	Borrowstoness
Moltkefels, 4,921.	"	Colombo
Neptun, 116.	"	Chatham
Neumunster, 4,224.	"	Fremantle
Nyland, 1,533.	"	Hull
Oberhausen, 4,322.	"	Hobart
Odessa, 3,046.	"	Castletown (Berehaven)
Olinda, 1,915.	"	Newcastle, N.S.W.
Oriental (yacht).	Aus.	Southampton
Osnabruck, 4,240.	Ger.	Sydney, N.S.W.
Ostpreussen, 1,755.	"	Blyth
Otto, 139.	"	Leith
Pageantum, 5,000.	"	Calcutta
Paklat, 1,657.	"	Hong Kong
Paulo III.	"	Portsmouth
Perla, 5,355.	Aus.	Calcutta
Pfalz, 6,570.	Ger.	Melbourne
Polnay, 3,682.	Aus.	London
Prinz Sigismund, 3,302.	Ger.	Brisbane
Professor Woermann,	"	
6,061.	"	Sierra Leone
Providentia, 2,970.	"	Manchester
Quarta, 1,824.	"	Straits Settlements
Rajaburi, 1,904.	"	Hong Kong
Raner, 808.	"	Straits Settlements
Rappenfels, 5,883.	"	Colombo
Reima, 1,300.	Aus.	Vessel completing at Sunderland
Reichenfels, 4,679.	Ger.	Colombo
Rheinfels, 5,512.	"	Bombay
Riga, 2,156.	"	Gibraltar
Roland, 1,377.	"	Plymouth
Rotenfels, 5,589.	"	Calcutta
Rothersand, 140.	"	Kirkcaldy
Ruhdi, 5,442.	"	Simon's Bay
Sabbia, 2,752.	Aus.	Newcastle-on-Tyne
Sandakan, 1,793.	Ger.	Straits Settlements
Santa Catharina, 4,247.	"	Reported captured and taken in to Rio de Janeiro
Scharzfels, 5,513.	"	Adelaide
Schneefels, 5,826.	"	Gibraltar
Seeadler, 1,377.	"	South Africa
Senator Dantziger, 164.	"	Tralee, Cork
Senegambia, 3,780.	"	Reported captured near Tsingtau
Serak, 4,680.	"	Cardiff
Signal, 1,449.	"	Brisbane
Steinturm, 5,266.	"	Colombo
Stella Maris, 19.	"	Southampton
Stolzenfels, 5,553.	"	Sydney, N.S.W.
Sturmvolgel, 1,377.	"	South Africa
Sudmark, 5,113.	"	Reported captured and taken to Alexandria
Sumatra, 7,484.	"	Sydney, N.S.W.
Susanne Vinnen, 2,739.	"	Newcastle, N.S.W.
Syra, 3,597.	"	Gibraltar
Tergestea, 4,272.	Aus.	Sunderland
Terpsichore, 2,025.	Ger.	Limerick
Theodore, 230.	"	Granton
Thuringen, 4,994.	"	Melbourne
Tiberius, 4,149.	"	Sydney
Tilly, 109.	"	Grangemouth
Trifels, 5,750.	"	Colombo
Trostburg, 6,342.	"	Calcutta
Turul, 3,530.	Aus.	Sydney, N.S.W.
Ursus, 2,190.	Ger.	Hull
Varzin, 4,455.	"	Perim
Vianna, 400.	"	Granton
Wartenfels, 4,511.	"	Aden
Warturm, 4,965.	"	Bombay
Wega, 839.	"	Alloa
Welle, 117.	"	Aberdeen
West, 208.	"	Poole
Wildenfels, 5,512.	"	Melbourne
Wilhelm, 187.	"	Fowey
Wotah, 3,834.	"	Newcastle, N.S.W.
Zichy, 1,877.	Aus.	Malta

SHIPS WHOSE CARGOES OR PART OF THEM, HAVE BEEN DETAINED.

Name & Tonnage.	Nationality.	Detained at
Agapenor.	Brit.	London
Anglo-Mexican.	"	London
Argo.	"	Swansea
Bilbster, 4,478.	"	Cardiff
Brooklet.	"	London
Buffalo.	"	Hull
Campanello, 9,291.	"	Cardiff
Cape Corso.	"	London
Cania.	"	Liverpool
Cayo Gitano.	"	Manchester
Chama.	"	Liverpool
City of Stockholm.	"	
1,336.	"	Dublin
Clan McKinnon, 4,788.	"	Liverpool
Dalecrest, 4,277.	"	Liverpool
Durham Castle, 8,228.	"	London
Eastern Coast.	"	London
Egwansa.	"	Liverpool
Emilverne, 544.	"	Rochester
Gab-ka.	"	London
Gartshore.	"	Glasgow
Glamorgan, 3,539.	"	Manchester
Gravina, 1,242.	"	London
Greenbank, 3,881.	"	Cardiff
Greenland.	"	Liverpool
Groeswen, 3,570.	"	Cardiff
Harelda.	"	Southampton
Hartside, 2,740.	"	Liverpool
Haulwen, 4,032.	"	Cardiff
Heathmore, 3,147.	"	Swansea
Helenus.	"	London
Import, 847.	Netherland	London
Indrabarah.	Brit.	London
Iolo, 3,903.	"	Portsmouth
Keemun.	"	Liverpool
Khyber.	"	London
Kumeric, 6,232.	"	Liverpool
La Blanca.	"	London
Lesraux, 3,009.	"	Falmouth
Lockwell, 3,536.	"	Cardiff
Lord Downshire.	"	Manchester
Lusitania.	"	Liverpool
Machao.	"	London
Marengo.	Brit.	Hull
Maryland.	"	London
Milcent Knight, 3,563.	"	Cardiff
Milo, 1,475.	"	Swansea
Miramichi.	"	Manchester
Moldavia.	"	London
Myazaki Maru.	Jap.	London
Nellere.	Brit.	London
Nephrite, 673.	"	Middlesbrough
Nevada.	"	London
Newburn.	"	Gravesend
Ocean, 4,657.	"	Cardiff
Ormsdon.	"	Glasgow
Orteric, 6,535.	"	Liverpool
Orthia.	"	London
Petridge.	"	London
Phemius.	"	London
Rotorua.	"	London
Roumanian.	"	London
Runo.	"	Hull
St. Helena, 4,203.	"	Manchester
Saxon.	"	London
Sheaf Field.	"	Cardiff
Soldier Prince, 3,118.	"	London
Stephanie.	"	London
Stork.	"	London
Tanagra.	"	London
Toronto.	"	Hull
Tranquebar.	"	London
Trojan.	"	Liverpool
Victoria, 165.	"	Plymouth
Worcestershire.	"	London
Zambesi, 3,752.	"	Sydney

VESSLS DETAINED OR CAPTURED BY THE FRENCH NAVAL AUTHORITIES.

His Majesty's Government have received from the French Government the following list of vessels which have been detained or captured by the French Naval authorities.

Name.	Nationality.	Where seized.
Arcturus.	Ger.	Bordeaux
Adriana.	"	Rouen
Christiana.	"	Havre
Consul Horn.	"	Bordeaux
Dimorah.	Aus.	Havre
Filli.	Ger.	Cannes
Elka Koppen.	"	Nice
Frida Mahn.	"	Boulogne
Gradac.	Aus.	Brest
Kalymon.	Ger.	Bizerta
Kawak.	"	Bizerta
Nertune.	"	Rouen
Porto.	"	Cherbourg
Tibor.	Aus.	Bordeaux
Tolna.	Aus.	Nice
Czar Nicolai II.	Ger.	Bizerta

REQUISITIONING OF BRITISH SHIPS.

HIS MAJESTY has appointed The Right Honourable, the Lord Mersey, P.C., to be President, and William Walton, Esq., to be Vice-President of the Board of Arbitration, contemplated by the Proclamation of August 3rd, relating to the requisitioning of British ships for His Majesty's service. The members of the Board will be gentlemen representing the various branches of the Shipping Industry. The Admiralty having asked the Institute of Marine Engineers to nominate a representative, it was decided at a meeting of the Council of the Institute, specially convened, to nominate Mr. James Denny (Past-President), who has expressed his willingness to serve. The procedure set out in the following rules will be followed as far as may be practicable.

1. All claims whatsoever arising out of or in respect of the requisitioning of any British ship or vessel under His Majesty's Proclamation of August 3rd, 1914, shall be made out in full detail, and left in triplicate with or sent to the Secretary of the Admiralty, Whitehall, S.W., so soon as may be, and in no case later than within one month from the taking up of the ship or vessel for His Majesty's service.

2. The claim shall be accompanied with all necessary vouchers and supporting documents, and such explanatory statement as may be required to make clear the nature of the claim and the grounds thereof.

3. Each claim shall be considered by the Admiralty, who shall negotiate with the claimant, with a view to the adjustment and settlement thereof by agreement.

4. If the Admiralty and the claimant fail to arrive at an agreement within a reasonable time, to be determined in each case by the President of the Board of Arbitration, the Admiralty shall report the matter, with the necessary papers, to the President, who shall refer the claim to two arbitrators selected by him from the panels of arbitrators for consideration and report. The arbitrators so selected shall have regard to any directions or instructions they may receive from the President; they may call for such further papers, evidence and particulars as they may require, and, if they think fit, may call upon the Admiralty and the claimant either to argue the matter before them or to submit written arguments on any points.

5. The joint award of such arbitrators shall be final. If they are unable to agree, the matter shall be referred to the President of the Board of Arbitration as umpire, who may require such further papers, evidence, particulars, or argument as he may deem necessary. The award of the President shall be final.

6. Any matter or question of procedure not disposed of by these rules, or any question arising thereon, shall be determined by the President of the Board of Arbitration as in his discretion he shall think to direct.

7. The Vice-President of the Board of Arbitration may, by direction of the President, act in any matter hereunder for the President, and he may also act as President should the President, for any reason, at any time, be unable to act. Any direction or decision of the Vice-President when so acting for or as the President shall be as effectual as though made or given by the President.

By the addition of certain rules, it is provided, among other things, that the President may, from time to time, vary or supersede the existing rules for regulating the procedure of the Board, or of the arbitrators nominated by him, to such extent as he may consider necessary or desirable and may also make additional rules of procedure.

Also, the President may, from time to time, authorise the members of the panel as a body, or any of them, and whether with or without the inclusion of himself, or of the vice-president, to act as a board for the consideration of questions of general applicability, such as the approximate monthly rate of hire for vessels of different classes, and similar matters.

NAVAL ENGINEER APPOINTMENTS.

The following appointments have been made at the Admiralty:—

ENGINEER CAPTAINS.—J. P. Stevens, to *President*, for overseeing duties; W. D. Chope, to *President*, for duty as engineer-overseer, Sheffield District; H. R. Teed, for service in Engineer-in-Chief's Department, at the Admiralty; C. G. Taylor, to *Lion*, for service on Staff of Vice-Admiral, commanding 1st Battle Cruiser Squadron.

ENGINEER COMMANDERS.—J. W. Milner; L. Robins; J. J. Kirwin, to *Columbine*, for overseeing duties; H. G. Leader (retired), to *Pembroke*, for *Sirius*; A. E. Everitt, to *Aboukir*.

ENGINEER LIEUTENANT COMMANDERS.—W. Smith; A. S. Wise; A. E. Rayner, to *Victory* for *Kent*; E. Wyles, to *Victory*, for oil fuel course; A. E. Cock, to *Aurora*; W. G. Colquhoun, to *Dido* for *Miranda*; H. S. Briggs, to *Jupiter*.

ENGINEER LIEUTENANTS.—A. Pettmann (re-instated on active list); R. Kilpatrick (emergency list); H. H. Wilkins (re-instated on active list); A. T. Lloyd (retired), to *Halcyon*; A. C. Brook, to *Aurora*; T. J. Wells (retired), to *President*, for inspection of gun-mountings at Elswick; E. J. Parr, to *Powerful*; F. Mills, to *Victory*; E. F. St. John, to *Impregnable*; W. J. Penrose, to *Victory*; C. B. Sheppard, to *Woolwich*, for *Attack*; V. O. Foreman, to *Victory*, for *Kent*; E. R. Abbott; H. O. Hill; P. S. Oram; F. G. Escombe; G. W. Kidd; J. B. Hyde; J. M. Duncan; H. M. Kenny; D'A. M. Chapman; W. H. Robertson; H. Armstrong (temporary service); H. Hodson, to *Vivid*, for *Warspite*; S. G. Nancarrow, to *Prince of Wales*; D. Ritson (retired); F. T. Addyman (pensioned), to *Pomone*, for R.N. College, Dartmouth; W. A. C. Sandford-Thompson; A. C. Sharpe; H. L. Quick; L. W. Wright; R. M. Pakenham-Walsh; A. B. Brown; A. F. Paterson; (Retired) G. C. T. Turner; H. T. Leverett and G. Davidson, all to the Racer, additional, for R.N. College, Osborne; R. G. Markham (emergency list).

ENGINEER SUB-LIEUTENANT.—H. Hunter.

Temporary commissions have been issued to the following gentlemen:—

CHIEF ENGINEERS.—A. E. Philip, A. Gillespie, A. Bryce, C. E. Manners, J. Robertson, J. R. Clay.

SENIOR ENGINEERS.—T. P. Whitwell, J. Ackers, G. Patterson, J. C. Tofield, D. M. McWilliam, W. Lewis.

ENGINEERS.—J. Dixon, J. McAdam, J. M. Dowie, W. B. Lumdie, E. F. Taylor, J. Dobson, H. Richards, W. Roberts, G. Hayes, C. Joslin, A. T. White, G. Wood, M. Hindmarsh, W. Graham, T. E. Legg, J. Sloan, T. Alexander, T. Frazer, G. Harborne, F. J. Dunne, G. Young, W. Jones, J. Husk, C. Galloway, A. Galloway, D. B. Hall, T. Osborne, J. C. Daniel, H. Pratt, R. C. Rogers, J. White, A. Cockburn, R. Adams, A. Duncan, J. Carter, H. W. Botting, P. N. Reid, H. Cattle, A. D. Govan, H. McIntyre, R. Jones, R. Wylie, A. Kyle, D. Mackenzie, A. Flenley, G. G. Armit, S. C. Kelly, R. Cross, G. C. Knight, R. Steele, A. McKenzie, J. Sim, J. R. Dowling, J. Imrie, H. P. Jack, A. S. Hall, J. E. Roberts, J. A. W. Galloway, W. A. McKie, G. R. Rutledge, A. J. Forbes, G. A. McLellan, W. M. Wood, S. L. Parker, H. J. Tither, J. Lightfoot, J. Miller, H. J. Evans, A. M. Forrester, R. Bruce, R. G. L. Markham.

ASSISTANT ENGINEERS.—G. Middleton, D. W. Trumper, F. Downs, S. Aldcroft, R. P. Liddell, F. Glennie, R. McIntyre, E. Vick, P. Prince, E. Hyland, J. Chrystie, F. Horton, L. McIntosh, J. Fields, A. Cunningham, J. Kenworthy, J. Burnell, R. C. Green, F. B. Duncan, P. R. Drewe, A. J. Larson, W. Patterson, E. Burslem, R. Duncan, E. Kelly, H. McFarlane, E. Pearson, F. M. Curror, J. Lea, F. Duers, J. R. Moffatt, J. Paton, C. Fenton, R. H. Pring, J. Morrison, C. O. Bona, J. Sawie, H. McFall, W. Allan, A. Robertson, A. Chalmers, D. McI. Wight, H. S. Hinton, J. Baxter, J. Calder, J. D. Smith, I. J. Thomas, W. Humphreys, A. Manson, N. H. T. Hill, C. W. Howd, D. Matheson, D. A. Sheehy, D. M. Johnston, W. Turner, W. Houston, J. Piggott, J. McAdam, G. Herd, H. Jones, R. Williams, R. Waller, H. E. Byrne, A. L. Craig, A. B. Blake, J. Ellis, R. Dempsey, B. Fleming, E. Gort.

WARRANT ENGINEERS.—J. Balmer, to *Amphitrite*; E. H. Bowen, to *Victory* for *Kent*; J. McGavin, to *Vernon*, for duty with trawlers.

NAVAL MATTERS—PAST AND PROSPECTIVE.

(From our own Correspondents.)

Portsmouth Dockyard.

THERE have been no surprising or startling incidents of any consequence to disturb the life at this port since last month. Everyone seems to have settled down to war conditions. Of course, there is constant activity in the dockyard, but as to its nature complete reticence must be observed in the public interest. As regards new construction, the battleship *Queen Elizabeth* is the principal vessel upon which men are now at work, and there can be no harm in stating that she is expected to be ready for service early in January next, or two years and three months after the laying of her keel. It was hardly anticipated that so large and novel a ship would be finished within the two-year period, the tremendous amount of work to be put into her making this impossible unless other urgent and important jobs were neglected. While no smaller ships are under construction, we hear from time to time of vessels from the private yards allotted here for stores, manning and provisioning. From the naval appointments publicly announced by the Admiralty, it seems to be possible that the *Emperor of India*, built at Vickers, a sister ship of the *Iron Duke*, now flagship of Admiral Jellicoe, will be one of these. Commander F. G. S. Peile, fresh from the Admiralty War Staff, has been appointed her navigating officer. Three of the light cruisers of the "Arethusa" class in hand at Messrs. Beardmore's may also come here, the *Galatea*, *Inconstant* and *Royalist*. It may be hoped that these vessels will have as early and as good an opportunity of getting at the enemy as the *Arethusa* herself had off Heligoland on August 28th. Another new ship allotted to Portsmouth for fitting out has been the *Broke*, formerly one of the Chilean destroyers. Commander H. V. Dundas, from the *Shark*, has been given command of this vessel. Then there are also submarines coming along for commissioning, about which it is essential to be reserved. The naval appointments, however, have included the names of officers to command *E 13* and *E 15*, which will probably join the other boats of the "E" type in what was formerly called the Eighth Flotilla, which is based on Portsmouth. From all accounts, the submarines are doing splendid work in scouring the enemy's coasts and even his harbours for information. The completion of further boats is therefore, if anything, more important than the completion of battleships, for the latter cannot come into direct play until the enemy's fleet puts to sea. But it does not follow that they are not needed in the North Sea, for it must be due as much to the support they have afforded the light cruisers and small craft nearer the enemy's lines as to these latter units that the German Fleet has not yet ventured out. Turning to repair work, the vessels in dockyard hands when war began have nearly all gone to sea. One of the principal ships was the *Kent*, which is to be commissioned on October 2nd by Captain J. D. Allen, from the Admiralty yacht *Enchantress*. Another cruiser was the *Hermione*, which went out last month under the command of retired officers, even to her gunner. Her commanding officer is Captain H. F. Aplin, who is well known in the Mercantile Marine by reason of his former position as Inspector of Life-Saving Apparatus under the Board of Trade, whose service he entered after his retirement some six years ago. Speaking of the Mercantile Marine reminds me that several of the big liners taken up as armed merchant cruisers have taken their crews from Portsmouth. These vessels are valuable for many duties, their large size and equipment for ocean voyages enabling them to keep the sea for long periods in all weathers, able to report suspicious occurrences at any time. While not as heavily armed as most cruisers, their high speed enables them to run for safety if met by superior ships. Several interesting personal changes have been caused by the war. The flag-lieutenant to Sir Hedworth Meux being wanted on the Admiralty War Staff, Sir Hedworth's brother, the Hon. D'Arcy Lambton, who was a lieutenant in the Navy, but resigned in 1890 and has since served in the Army, has been called up to fill the vacancy here. Commodore Nicholson, formerly commanding the royal yachts, has

assumed command of the ex-Turkish battleship *Agincourt*, to which he has taken several officers from the yachts. Captain D. B. Crampton, from the royal yacht *Alexandra*, now commands the merchant cruiser *Kinfauns Castle*. The Inspector of Diving, Gunner A. Y. Catto, now commands a torpedo boat in the port flotilla. But one might go on indefinitely in noting the many changes, obviously pre-arranged, which have been made so smoothly and expeditiously.

Devonport Dockyard.

The loss of the *Oceanic* was especially deplored at Devonport, as her naval commander, Captain W. F. Slayter, was last afloat in command of a Devonport ship, the *Carnarvon*. He has the reputation of being one of the best navigators in the Service, and sympathy is felt for him in the hard luck he has experienced in losing the *Oceanic*. It is said that the continuous fog, which shut out a view of the sun for over a week, was mainly responsible for the misfortune. No doubt he will soon get another ship, and may even be afloat again before these lines appear. Quite a number of well-known naval officers are now commanding merchant liners fitted as auxiliary cruisers. At least three of these vessels, moreover, have admirals as their commanding officers. The late King's Harbour Master at Portland, Rear-Admiral O. F. Gillett, is in the *Armada Castle*, which was commissioned for naval service on August 7th, since when changes in the flag list have promoted her commander, then a captain, to be a rear-admiral. More interesting, however, is the patriotic action of two admirals much higher on the flag list, Admiral Sir Alfred Paget and Vice-Admiral James Startin, who retired from the regular service and accepted commissions in the Royal Naval Reserve in order to take command of armed yachts serving as auxiliary warships. Another unfortunate mishap has to be noted in the sinking of the *Fisgard II*, off Portland on September 18th. Originally the battleship *Invincible*, which was once the flagship of Sir Beauchamp Seymour (Lord Alcester) at the bombardment of Alexandria in 1882, this vessel had been serving at Portsmouth as part of the training establishment for boy artificers, and was on her way here to be fitted out for other duties when she turned turtle in the gale. A good deal of machinery went down with her. She was, of course, only a hulk, with no motive power of her own, otherwise she might have weathered the rough seas. New construction is proceeding steadily, and also repair work. Judging by the work of the *Arethusa* in the Heligoland affair, her sister ship, the *Aurora*, which has been under construction here, will have plenty of opportunities for distinguishing herself, as will the other six cruisers of the class which are being turned out by the private yards. With the main German Fleet keeping its ports, these light cruisers are just the thing to lead the flotillas engaged in penetrating into the enemy's lines. Of the refitting work in the yard, an indication that the *Donegal* will soon be out of hand was afforded by the appointment of Captain C. D. Carpendale, from the Naval Ordnance Department, to command her on commissioning. Other vessels under repair are also making good progress. Among the many changes in the training establishments brought about by the war, none is more interesting than that at the Royal Naval College at Keyham. This was formerly devoted to the training of young lieutenants who had volunteered to specialize in engineering duties, but these students have now taken up their war appointments afloat, and their chief, Engineer-Captain C. G. Taylor, has been appointed to the *Lion* as principal engineer officer of the First Battle-Cruiser Squadron, which so distinguished itself under Vice-Admiral Sir David Beatty at the Heligoland affair. As the college buildings were therefore idle, a use has been found for them in training the naval cadets entered direct from public schools, which were formerly in the cruiser *Highflyer*. This vessel, as is now well known from the fact that she sunk the *Kaiser Wilhelm der Grosse*, is employed on active service, and therefore cannot continue as a training ship. A new head has been found for the Keyham College in the person of Captain G. R. Mansell, a retired officer who was for many years in command of the royal yacht *Alexandra*. In many of the other training schools the services of retired officers have been utilized to take the places of those who have joined the Fleet, as it is essential to keep the establishments going for future requirements.

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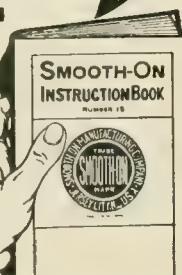
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Chatham Dockyard.

This yard has been the first to receive injured warships after a naval engagement of any consequence during the present war. The *Arctura* and some of the "L" class of destroyers came in here for repairs after the action of August 28th. What they accomplished then is now too well known to need repetition here, but it would be a mistake to suppose the success was achieved without some damage being inflicted on our gallant vessels. The *Arctura*, being the leader in the attack, suffered most, and had the misfortune to receive a shell or more early in the affair which reduced her speed to ten knots. Some of the destroyers also got a bit knocked about. All survived, however, and their officers and men are naturally proud of the achievement. On board each destroyer there has been fixed a brass tablet bearing the word "Heligoland" and the date. Besides this official recognition of their part in this plucky and well-executed affair, many ships have their own peculiar mementoes, one a

1891, but Captain Harold Christian, who retired last year and was to have gone out to China to advise on naval matters, has been given command of the vessel. One of her sister ships, the *Sirius*, also on the non-effective list, has been commissioned by Commander W. H. Boys (retired), and will take up duty as tender to the *Excellent*, the gunnery school-ship at Portsmouth. Yet another old cruiser fitting out for duty is the *Hermes*, which was last employed as parent ship of the Naval Air Service. Of ships under refit, one of the chief is the *Cornwallis*, one of the "Duncan" class of battle-ships. The appointment of Captain C. E. Le Mesurier to command her indicates that she will not be long now before being passed out of dockyard hands.

Sheerness Dockyard.

The arrival here of the vessels which fought in the Heligoland battle has been the principal event of the past month. The ships only stopped here to land wounded and prisoners



The British Battle-Cruiser *Lion*.

Flagship of Vice Admiral Sir David Beatty, K.C.B., etc., Commanding First Battle Cruiser Squadron.

Displacement, 26,350 tons. H.P., 70,000. Carries eight 13.5" and sixteen 4" guns.

Dimensions:—Length, water line, 675'; beam, 86½'; maximum draught, 30'.

This vessel gave the *coup de grace* to the German cruisers in the action off Heligoland on August 28th.

lifebuoy picked up from an enemy's vessel, another portions of shell, and the like. From the stories of those who took part, the German gunnery does not appear to be of so high a standard as was claimed. The *Mainz*, one of the cruisers sunk, is said to have made the best marksmanship on her side. Chatham dockyard may claim more than an ordinary share in the Heligoland exploit, seeing that the *Arctura* was not finished when war began. She was quickly rushed out, commissioned, and went straight into action. Among the casualties on board her was that of the signal officer of the flotilla, Lieutenant Westmacott, whose death was a real loss to the ship. His place has now been taken by Lieutenant-Commander M. B. Birkett, from the destroyer *Zulu*. Some more ships from the reserve have gone to sea since last month. These include one or two cruisers whose fighting days were thought to be over. The ships have, however, been brought back for auxiliary service. The *Brilliant* is one of the cruisers in question. She was on the sale list, having been built in

before going on to Chatham for docking. Large numbers of people flocked to get a sight of them, especially as it was a Sunday. The visitors expected to see most damage on board the *Arctura*, but the injuries to the destroyer *Liberty* were much more apparent. This little vessel lost her gallant commander, and she and the *Laurel* bore the brunt of the fighting for a brief period. The *Laertes* was another of the Third Flotilla which suffered when the initial attack was made. That none of the British vessels of any class were lost speaks volumes for the skill with which they must have been handled. The loss of the *Speedy* by striking a mine caused some anxiety in the port for the safety of other vessels, but there appears to be no ground for any such feeling. It was evidently a stray mine, one that had been swept from its original position, which sunk the *Speedy*, because from the official announcements on the subject it appears that certain channels are being regularly swept by the authorities, and as long as ships keep to them they are practically safe. The

Speedy, however, is understood to have been acting as escort to a mine-sweeping flotilla, and must therefore have been in proximity to one of the German mine-fields. She was commissioned here for fishery duties in March last. It was most satisfactory that her crew were saved. The part taken by the Royal Naval Air Service in the war is being keenly followed at Sheerness, but information is necessarily very meagre. Large numbers of civilian airmen have thrown in their lot with the Navy's flying men, Mr. Grahame-White having received a commission among others. From the announcement of the Secretary of the Admiralty on September 18th, it became generally known that Commander Samson and possibly other officers and men from Eastchurch had been doing duty in France, in conjunction with an armoured motor force. Their encounter with Uhlans near Doullens shows that they must be having some exciting experiences in their attacks upon the German communications. Three years ago, Commander Samson flew over the Kaiser's yacht when it arrived in the Medway bringing His Majesty to England for the unveiling of the Queen Victoria Memorial. It would be a fine thing if the Commander got a chance of making a flight over the Kaiser's present headquarters in the field.

IRON AND STEEL INSTITUTE.

IN consequence of the war, the Comité des Forges de France has been obliged to cancel all arrangements for an Autumn Meeting of the Institute in France this year. Under the circumstances, the Council has decided that it would be advisable to postpone for the present the organization of any alternative arrangements for an Autumn Meeting for the reading and discussion of papers. A number of papers have been submitted with a view to their presentation at the meeting which was to have been held at Paris, and the Council proposes to print copies of those papers and to invite discussion thereon by correspondence. Members who desire to send in written communications in discussion of any of the papers can be supplied with copies of those in which they are interested on application to the Secretary. The papers and correspondence thereon will be published in the next number of the Journal. The following is the list of papers submitted:—E. D. Campbell: "Note on the theory of hardening and on the constitution of steel." G. S. Cooper: "By-product coking industry and its relation to the manufacture of iron and steel." L. Duffy: "Determination of cobalt in high speed steels." J. Guillet: "Electrolytic iron, its manufacture, properties and uses." G. Hailstone: "Transverse testing of cast iron." W. L. Johnson: "Utilization of heat contained in slags." N. G. Kapp: "Mechanical charging of blast-furnaces." P. Nicou: "Iron ore deposits of Lorraine and the West of France." H. de Nolly and M. Veyret: "The transformations of steels." J. A. Pickard and F. M. Potter: "Oxygen content of open hearth steel." A. M. Portevin: "Decarburization of the steels in salt hardening baths." A. M. Portevin and V. Bernard: "Influence of coalescence on mechanical properties of steels and alloys." A. Sahlin: "Use of liquid ferromanganese in the steel processes." A. Spannagel: "New process for heating blast-furnace stoves."

BUSINESS AS USUAL

IT may interest our readers to know that Messrs. James Walker & Co., Ltd., "Lion" Works, Garford Street, West India Dock Road, London, E., the well-known manufacturers of patent "Lion" packings, jointings, etc., propose working at full time during the war, and they have made arrangements whereby the work can be carried on without any interruption. The whole of the raw material used by this Company is British manufacture, and the war trouble therefore does not affect them to any great extent. Some of their employees have been called away either to join the Territorial Forces or other Branches of Service, and consideration is being given to those who are dependent on them while they are away, and their situations are kept open, so that when the war is over they may go back to their former employment.

MR. CHARLES BUCHANAN.

The announcement of the retirement of Mr. Charles Buchanan, Principal of the Chief Ship Surveyor's Staff of Lloyd's Register, has been received with much regret throughout shipbuilding and shipping circles, especially so as the step is due to medical advice. He has been in the service of Lloyd's Register for over thirty-four years, as many as twenty-three years of which long period he has been in the Head Office in London. His popularity is parallel with his varied experience as a naval architect in many shipbuilding centres, and with his intimate acquaintance with practical shipbuilders from all quarters frequenting Lloyd's offices. Prior to joining the service of Lloyd's, as a surveyor, in June, 1880, he held the position of chief draughtsman in the shipyard of Messrs. A. McMillan & Son, Dumbarton, with whom also his apprenticeship had been served, starting in 1870. For about twelve years Mr. Buchanan represented



Mr. Charles Buchanan.

the Society in sequence at Barrow, Stockton, Middlesbrough, Hartlepool, Sunderland and Newcastle, and in 1892 he was transferred to the staff in London. During the greater part of the long period he has been at headquarters, Mr. Buchanan's duties have been more particularly associated with the scrutiny and passing of ships' constructional plans submitted for the Committee's approval, and in this way he has been enabled to gain a thoroughly up-to-date knowledge of the developments and trend of shipbuilding practice throughout the world. For seven years prior to the death of the Chief Ship Surveyor, Dr. S. J. P. Thearle, in November of last year, Mr. Buchanan held the position of Assistant Chief Ship Surveyor, and since the appointment of Prof. Westcott S. Abel to the Chief Surveyorship in January last, the new office of Principal of the Chief Ship Surveyor's Staff has been ably filled by Mr. Buchanan. In his retirement, from health considerations, he takes with him the sincere regards and best wishes of all classes of colleagues and of shipbuilding friends everywhere.

BRITISH TRADE OPENINGS.

Engine and Boiler Packing.

A LEAFLET issued by the Commercial Department of the Board of Trade shows the value of engine and boiler packing exported from Germany, Austria-Hungary and the United Kingdom to the principal markets to which the two first named countries send such goods.

Exported to	from Germany (1912).	from Austria- Hungary (1913).	from United Kingdom (1913).
	£	£	£
British India	1,800	650	30,600
Norway	6,350	140	6,500
Sweden	6,850	20	6,100
Denmark	5,200	200	4,100
Netherlands	17,150	4,560	7,600
Belgium	17,100	2,430	10,600
France	11,100	7,760	12,400
Switzerland	8,700	1,530	300
Spain	6,350	430	3,700
Italy	12,900	1,880	2,200
Servia	500	280	—
Roumania	2,800	930	900
Russia-European	12,300	12,080	5,700
Turkey-European	900	1,150	2,400
Turkey-Asiatic	—	150	500
Egypt	1,300	410	4,800
Dutch East Indies	2,150	50	500
Japan	3,000	10	5,600
Argentina	10,700	270	10,100
Chile	2,900	160	9,400
United States	11,250	2,300	10,800
Total	141,300	38,480	134,800

It will be seen that while the United Kingdom holds a strong position in the Indian, Egyptian, Chilean, and United States markets, our position is less strong in the remainder. In Norway and Sweden the trade is about equally divided between the United Kingdom and Germany, but in the remaining European markets specified, and in the Dutch East Indies, there is room for considerable expansion in the sales of British made engine and boiler packing.

PRINCIPAL GERMAN MARKETS.

The following additional information is available as to the principal markets to which piston packing, stuffing-box packing, luting cords, and "Klingerit" boiler jackets, calking slabs, calking rings, etc., of asbestos, of asbestos paper or asbestos tissues were exported from Germany in 1912, and the value of the exports sent to each:—

Exported to	Piston packing, stuffing-box packing, luting cords.	"Klingerit" boiler jackets, calking slabs, calking rings, etc., of asbes- tos, of asbes- tos paper or asbestos tissues.
	£	£
British India	1,500	300
Norway	3,300	3,050
Sweden	4,350	2,500
Denmark	3,150	2,050
Netherlands	10,850	6,300
Belgium	6,100	11,000
France	4,600	6,500
Switzerland	5,050	3,650
Spain	3,650	2,700
Italy	4,500	8,400
Servia	400	100
Roumania	1,600	1,200
Russia (European)	5,500	6,800
Turkey (European and Asiatic)	650	250
Egypt	1,000	300
Dutch East Indies	1,750	400

Japan	2,700	300
Argentina	6,700	4,000
Chile	2,100	800
United States	1,750	9,500
Total to above markets ..	71,200	70,100

The aggregate value of German exports of engine and boiler packing to the above markets amounted to £141,300, or 70 per cent. of Germany's exports of such goods to all destinations.

SUMMARY.

The aggregate value of the German and Austrian export trade in engine and boiler packing which might be recovered by British manufacturers may be summed up as follows:—

(a) In the United Kingdom market:—	
German Trade (1912):	£
Piston packing, stuffing-box packing, luting cords	12,450
"Klingerit" boiler jackets; calking slabs, calking rings, etc., of asbestos, etc.	14,150
Austrian Trade (1913):	
Engine packing of rubber	16,780
Total	£43,380
(b) In Colonial and Neutral Markets:—	
German Trade (1912):	
Piston packing, stuffing-box packing, luting cords	71,200
"Klingerit" boiler jackets, calking slabs, calking rings, etc., of asbestos, etc.	70,100
Austrian Trade (1913):	
Engine packing of rubber	38,480
Total	£179,780

With regard to Australia the total imports were during 1912, from United Kingdom £23,420, Austria-Hungary £3,549, Germany £5,089, all countries £46,098.

The imports into the Union of South Africa were, from the United Kingdom 1911, £18,399, 1912, £19,143, 1913, £17,038; Austria-Hungary, 1911, £482, 1912, £504, 1913, £308; Germany, 1911, £5,171, 1912, £3,846, 1913, £36,386.

Anchors and Chains.

Another publication issued by the Board of Trade deals with anchors, grapnels and chains, and the figures given below summarise the aggregate of the German and Austro-Hungarian exports of chains, etc., which might be replaced by British goods of a similar character.

(a) In the United Kingdom Market:—	
German trade (1912):	£
Anchors (ships' anchors)	18,000
Anchor chains, ships' chains, etc.	1,300
Cattle and other chains and parts thereof	4,600
Total	23,900
(b) In Colonial and Neutral Markets:—	
German trade (1912):—	
Anchors (ships' anchors)	350
Anchor chains, ships' chains, etc.	4,100
Cattle and other chains and parts thereof	89,550
Austrian trade (1913):—	
Chains	8,590
Total	102,590
Grand total	126,490

INSTITUTE OF METALS. —In consequence of the war, the Portsmouth meeting which had been fixed for September 10th was indefinitely postponed, and in its place a statutory meeting of the Institute was held on the date mentioned above at Caxton House, Westminster, London. The papers which would have been read at the Portsmouth meeting were taken as read at this statutory meeting, and discussion, invited by correspondence, will be published later in the journal of the Institute with the papers.

THE STRENGTH OF WELDS MADE BY THE OXY-ACETYLENE PROCESS.*

WELDING is usually defined as "the property possessed by certain metals, which, on cooling from the molten state, pass through a plastic stage before becoming quite solid and rigid, of being joined together by the cohesion of the molecules induced by the application of an external force such as hammering or compression." A dictionary definition of a weld is "to join together as iron or steel by hammering when softened by heat." These definitions imply that the weld is produced whilst the metal is in a state of plasticity, but below its melting point, and therefore unfused. In recent years the term "weld" has been applied to indicate a union of metals by fusion, either of the metals to be joined, or of a separate piece of metal used in the same manner as solder. The process is obviously an "autogenous soldering," although commonly termed "autogenous welding."

An ideal weld should exhibit not only perfect union of the pieces of metal, but the metal in the welded region should be in the same condition as that of the original material. With the exception of castings, metals which are welded are not in the condition of having simply cooled from the molten condition and become solid, but have been submitted to certain mechanical treatment, such as forging or rolling, for the purpose of removing internal stresses and looseness of texture inherent in metal produced by fusion. The strength and ductility of the material are in this manner greatly increased.

A weld produced by hammering or pressing together pieces of metal at a temperature sufficient to render them plastic only, and provided oxidation is prevented, should be as strong and reliable as the remaining metal; but in the case of autogenous welds, even if precautions are taken to guard against the presence of oxides, the welded portion cannot have the same properties as the original metal, unless it be submitted to a similar treatment to that which the original material underwent during manufacture.

The oxy-acetylene process of autogenous welding which has been largely employed of late years, owing to the comparative simplicity and the facility with which it can be carried out, has a very wide field of usefulness. The oxy-acetylene blowpipe gives a flame producing a clean and easily controlled heat, which can be adapted to almost any position. The extreme adaptability of the process has tempted some to apply it without due regard to the whole of the conditions obtaining in practice, with the inevitable result that many cases of failure have occurred. Several accounts of failures of boilers, valves, etc., repaired by oxy-acetylene welding have been published. The failures of boilers which have been published are not confined to cases of plates cracked in service and subsequently repaired by autogenous welding, the welded part having in turn given way, but cases of the seams of fire-boxes, and of the connection of crown plates to the cylindrical portion made by flame welding methods giving way, sometimes with disastrous results, have been recorded.

In some of these cases the welds were clearly defective owing to the presence of oxides, on account of an

* By Prof. A. Campion, F.I.C., and Mr. William C. Gray, A.R.T.C. (The Royal Technical College, Glasgow), read at the Summer Meeting of The Institution of Engineers and Ship-builders, Newcastle-on-Tyne.

excessive proportion of oxygen having been present in the welding flame, or to the use of fluxes in insufficient amount, or of an unsuitable nature. In other cases the welds have been imperfect and spongy, owing to the presence of gas cavities, or of particles of slag included within the metals. In view of the fact that the welds which have failed, and of which particulars have been published, all appear to have been made by experienced expert operators, it is not surprising that in many quarters the oxy-acetylene and other hot flame autogenous welding processes are considered unreliable and viewed with suspicion.

The marine department of the Board of Trade have made rules and regulations fixing the limits to the use of such processes in boiler work. The Government of Belgium has forbidden the use of autogenous welding in boiler construction, and in the case of extensive repairs. These restrictions will probably be relaxed in the future, as the conditions effecting the strength and other qualities of the welded portion, in comparison with the original metal, become more thoroughly understood, and experience is gained of the behaviour of welded material under various practical working conditions. The writers consider that until results of such experience are available due caution should be exercised in the use of autogenous welding for boiler and high pressure work.

As far as the authors have been able to ascertain the published results of investigations into the quality of welds made by fusion methods have, with one exception, dealt only with the changes brought about in the structure of the material, changes in the static tensile strength, and examinations for unsoundness and oxidation. Dr. F. Carnevali, in a paper entitled "Autogenous Welding of Metals" (oxy-acetylene process for iron, steel and pig-iron), gave the results of transverse impact tests made in a Charpy machine.

Dr. C. H. Desch has recently directed the attention of members of this Institution to the importance of the subject, and to the incompleteness of the data available as to the strength and reliability of autogenous welds in the following words:—"It must be admitted, however, that a joint made in this way has not the same qualities as the original steel. It is not sufficient to show that fracture does not commonly take place in the plane of union when a mechanical test is made. It is not the weld, but the zone immediately adjacent to it, which is injured. Neither are tensile tests conclusive on this point, as the injury to the steel does not always affect the tensile breaking strength, but is revealed when the welded steel is subjected to shock or fatigue." At the time when the statement was made, the authors were engaged upon the examination of a large number of welds of mild steel which had been made by the oxy-acetylene process, the object being to compare the strength and resistance to fatigue of the welded portion with that of the original material. The results of a large number of tensile tests of welded material have been published from time to time, and upon the basis of these results it has been argued that welds made by an autogenous process are as strong and reliable as the unwelded material. Tensile tests are not sufficient, for as is well known even in the case of unwelded steel, it frequently happens that excellent figures are obtained as regards tensile strength and elongation, and yet the material fails in practice when submitted to shock or vibration. If these tests are

unreliable in the case of such material as plates and bars, which, in the course of manufacture, have been submitted to careful thermal and mechanical treatment, under strict supervision, it seems very unreasonable to rely upon them entirely in the case of material which has been submitted to what after all is at best only a fusion or casting process. As a writer in one of the engineering journals stated recently:—"It is beyond all reason to claim that a mere melting process can produce the exact character of rolled steel."

The authors, as the result of an extended experience in the testing of steel and other metals, fully realized that although the results of static tension tests frequently indicate that the weld is almost as strong as the unwelded material, they may be quite at variance with the results of dynamic tests or the behaviour of the material in practice. Working conditions are usually such that the material is liable to repeated shocks, and in the course of the examination the authors made a large number of tests in order to compare the behaviour of the welded and unwelded material under repeated impact, and also to compare the results of such tests with the static tensile tests.

A large number of welds of mild steel were prepared, and submitted to static tension and repeated impact tests, in the ordinary condition, and also after various treatments.

The first series of tests were made on round bars of mild steel, containing approximately 0.25 per cent. carbon, five-eighths of an inch diameter. The tensile test bars were turned parallel for one and a half inches and three-eighths inch diameter, in order that fracture would take place in the weld. The elongation was measured on a one inch length. It was found that in most cases the fracture was much too ragged and uneven to allow of the final diameter being measured, so that no results for contraction of area at fracture have been recorded.

TABLE I.

Static tensile tests of $\frac{5}{8}$ inch diameter round bars of mild steel welded in centre.

Mark.	Description and Treatment.	Maximum Stress. Tons per sq. inch.	Means.	Extension on 1 inch per cent.	Means.
3	Unwelded and untreated	33.98	34.39	27.01	26.75
3 B		34.80		26.51	
3 N	Unwelded, heated to 800°C., and cooled naturally	32.40	—	29.3	—
3 W	Welded—untreated	29.8	29.1	2.5	5.9
3 W B		30.9		3.7	
3 W C		27.4		0.0	
4 W		28.5		9.9	
4 W B		29.2		7.5	
3 H	Welded and hammered	24.9	25.9	7.0	7.2
3 H B		25.9		6.0	
4 H		25.4		7.8	
4 H B		27.5		8.1	
3 H A	Welded and hammered, then heated to 800°C. for half an hour, and allowed to cool naturally	25.4	27.8	7.2	8.6
3 H A B		30.3		10.1	
3 A	Welded, heated to 800°C. for half an hour, and allowed to cool naturally	30.5	28.4	10.8	12.1
3 A B		29.7		9.7	
4 A		27.3		16.0	
4 A B		25.1		12.0	
3 Q A	Welded, quenched in water, heated to 800°C. for half an hour, and allowed to cool naturally	33.2	32.5	11.0	9.7
3 Q B		31.8		6.5	
3 Q C		32.7		11.6	

In Table I. the results of tensile tests of eighteen welded bars after various treatments are given, and as was to be expected considerable differences are shown, not only between the mean results for each treatment, but between individual bars of each set. This appears to indicate that there is an element of uncertainty about a weld, even when it has been made with the greatest care by an expert manipulator.

Analysing the results in Table I., the following interesting comparisons are obtained, taking the mean results for maximum stress and elongation of the original material as 100:—

		Maximum.	
		Stress	Elongation.
Mean results of—			
2 Unwelded bars	- - - -	100	100
5 Welds untreated	- - - -	84.6	22
4 Welds hammered	- - - -	75.3	26.9
2 Welds hammered and then reheated to 800°C.	- - - -	80.8	32.1
4 Welds reheated to 800°C.	- - - -	82.5	45.3
3 Welds quenched in water, then reheated to 800°C.	- - - -	94.5	36.2
Lowest results of each set—			
5 Welds untreated	- - - -	79.6	9.3
4 Welds hammered	- - - -	72.4	22.4
2 Welds hammered and then reheated to 800°C.	- - - -	73.8	26.9
4 Welds reheated to 800°C.	- - - -	75.9	36.2
3 Welds quenched in water, then reheated to 800°C.	- - - -	92.4	24.3

It would appear from these results alone that an average weld might be expected to possess something like four-fifths of the strength of the unwelded steel, and that the ductility would be about one-fifth. The maximum strength in tension does not vary to any great extent, but the ductility varies considerably from the average, as the lowest strength recorded is practically 80 per cent. of the original material, and the lowest elongation only 9 per cent. Hammering increases the ductility, and reduces the strength slightly. Reheating after hammering produces a further increase in ductility, and at the same time increases the maximum stress. Reheating to the same temperature, without previous hammering, produces a somewhat large increase in the ductility, and a further small increase in strength; whilst in the case of the specimens quenched in water and then reheated, the strength rises to almost that of the unwelded material, although the elongation has been reduced. It seems, therefore, that under no circumstances does the ductility of the weld approach that of the unwelded portion.

(To be continued.)

ENEMY PATENTS.

MESSRS. E. P. Alexander & Son, chartered patent agents, of High Holborn, write us that British manufacturers would do well to note that by virtue of recent legislation it is now open to them to apply to the Board of Trade for the suspension of patents owned by subjects of States at war with His Majesty, and the Board has power to grant licenses to applicants to make, use or sell the inventions protected by such patents. Such a license may be either for the continuance of the war, or for any period during the term of the Patent. In the latter case the license may be subject to conditions which may include the payment of royalties in proper cases to the State or to the patentee. Before granting an application the Board will require to be satisfied that it is in the general interests of the community or of a trade that the article or process patented should be manufactured or carried on.

BOILER DEFECTS.

AMONG the Board of Trade Reports of accidents and enquiries recently issued, there are a few of more than ordinary interest to marine engineers. In one case of a steamer, the air pump bucket dropped off the rod. This was put right, and two days afterwards the starboard furnace of the port boiler was found to be leaking at the upper part of the front. On removal of the furnace front, a crack was disclosed about twelve inches long circumferentially in the front tube plate, where flanged and the furnace riveted to it. The boiler was emptied and allowed to cool down, when the crack opened out more clearly. A temporary repair was effected by means of $\frac{1}{2}$ in. screwed pins interlocked, this enabled the vessel to go on with the two boilers to her destination. Examination at the outward port revealed the cause of the crack and at the same time showed that the other furnaces were similarly affected, the action being apparent on the water side of the plates and obviously due to alternate expansion and contraction, opening up the fibre of the metal at the junction of the plates between elasticity and rigidity. Patches were fitted on the plates to embrace the parts affected, one over each furnace. On the voyage home the air pump bucket broke and at a convenient port this was made good after a week's delay. The day after leaving port, it was found that leakage was showing at the front of the starboard boiler port furnace, this on examination showed to be coming from a crack thirteen inches long in a position similar to that on the other boiler. The interlocking pins were again tried, but as these did not prove effective, the vessel was steamed to an adjacent port with one boiler, and over each furnace a patch was fitted as in the port boiler. The home port was reached without any further trouble. The action on the plates had not been observed on previous examinations, and the boilers were otherwise found to be in good condition; the presence of scale had probably concealed the defects and shows that in the course of periodical inspection these portions should be scraped and cleaned. We have found traces of the action occasionally at the parts indicated in boilers, and the report published by the Board of Trade emphasizes the importance of watching indications and anticipating defects. The boilers which failed were of the ordinary single-ended type, 16 ft. in diameter by 10 ft. 6 in. long, fitted with three ribbed furnaces each 45 in. diameter, the tube plates were 1 in. thick, steam pressure 160 lbs., natural draught. The boilers were about sixteen years old.

In another case a steam trawler left port under steam and next day two explosions were heard, one after the other, and steam issued from the starboard furnace of the boiler, drowning the fire and scalding the driver. Examination showed that one of the tubes had burst, due apparently to a pitting action which had reduced it in thickness at the portion which gave way in two small holes and thus had caused the explosions. The boiler was 9 ft. 6 in. in diameter by 9 ft. 3 in. long, with two furnaces each having a separate combustion chamber; ninety-two tubes, twenty-four being stay tubes. The boilers were of steel and the tubes iron. The boiler was retubed after the experience of the burst tube.

Continued page 90.

NAUTICAL INSTRUMENTS.

IT is a matter of considerable convenience to all engaged in navigation to have at hand a book of reference dealing with a complete range of nautical instruments. Such a list has been prepared by the well-known firm of Messrs. Heath & Co., Ltd., of Crayford, London, the manufacturers of "Hezzanith" nautical and other instruments. Each instrument is illustrated and accompanied with a full specification of particulars and price, in some cases in four languages. Copies of the list will be sent to applicants who should address enquiries to "The 'Hezzanith' Observatory Works, Crayford." It should be borne in mind that the Company has an extensive factory equipped with up-to-date machinery for the manufacture of nautical and scientific instruments, and consequently they are in a position to take up the manufacture of any such instruments, and will be pleased to correspond with interested parties.

VESSELS LOST.

LLOYD'S Register of Shipping has recently issued a return of vessels lost, condemned, etc., during the first quarter of 1914. The total for steamships reaches seventy-eight vessels of a gross tonnage of 96,630. Nineteen of the vessels, of 17,847 tons, were owned in the United Kingdom and British Colonies. Seventy-three sailing vessels were lost, total gross tonnage 49,221, twenty being British of 8,214 tons.

The Board of Trade reports that during August notices were received of the following twenty-seven wrecked vessels: sailing, fifteen, tonnage 1,213, fifteen lives lost: steam, twelve, tonnage 14,816, five lives lost. The *San Wilfredo* of 3,928 tons, sunk by striking a mine in the river Elbe, and the *Hyades*, of 2,040 tons, sunk by a German warship in the South Atlantic Ocean, are included in the steam vessels lost. The five lives mentioned above were all lost in the steam drifter *Barley Rig*, which struck a mine in the North Sea.

BRITISH ENGINEERS' ASSOCIATION.

THE Committee of the British Engineers' Association has seized an opportune moment to issue the Official Directory of its members. Every *bona fide* British manufacturer of engineering plant and accessories is entitled to join the Association, which has now upon its registers the names of over 250 British manufacturing engineers, with a combined capital of about £100,000,000. As stated in the preface to the directory, the fact that a firm's name appears therein is a guarantee of its standing as a British manufacturing concern. The directory contains the full names and addresses of the members of the Association, with a very full classified index of trades. It has been submitted to the Foreign Office, and British Embassies, Legations, Consulates, and Trade Commissioners throughout the world will receive copies. The Board of Trade has requested that copies be supplied to its Commercial Intelligence Department for reference in connection with enquiries for engineering material which may reach the Department from abroad. The Association for some time past has been doing good work in endeavouring to secure for British manufacturing engineers their fair share of foreign trade; in fact, it constitutes the first attempt of British Engineers to organize themselves to capture their share of such trade. All credit is due to the Association for the work it has done and in view of the present circumstances it will no doubt receive even greater support than in the past for the purpose of securing to Great Britain greater engineering interests. The address of the Association is 32, Victoria Street, Westminster, London, S.W.

THE IMPERIAL TRANS-ANTARCTIC EXPEDITION.

The September number of "The Transactions of the Institute of Marine Engineers," announces that special application having been made to the Institute to provide a Chief Engineer for Sir Ernest Shackleton's ship *Endurance*, which has recently sailed to the South Polar regions, Mr. Lewis Rickinson, a member of the Institute, was recommended and appointed to the position.

The *Endurance* is a three-masted wooden vessel of 144 ft. overall length, 25 ft. breadth and a mean draught of 11 ft. 6 in. The machinery consists of a three-cylinder triple-expansion reciprocating engine, which develops about 350 h.p. and runs at 130 r.p.m. to obtain a speed of 10.5 knots. This is about the maximum speed obtainable, but the *Endurance* will rarely exceed a speed of 7 to 8 knots on the passage through the ice regions. The cylinders are 20 in., 18 in., and 14 in. in diameter, and the stroke is 24 in. In the engine-room there is a small CO₂ refrigerating engine for use in keeping a supply of fresh meat.

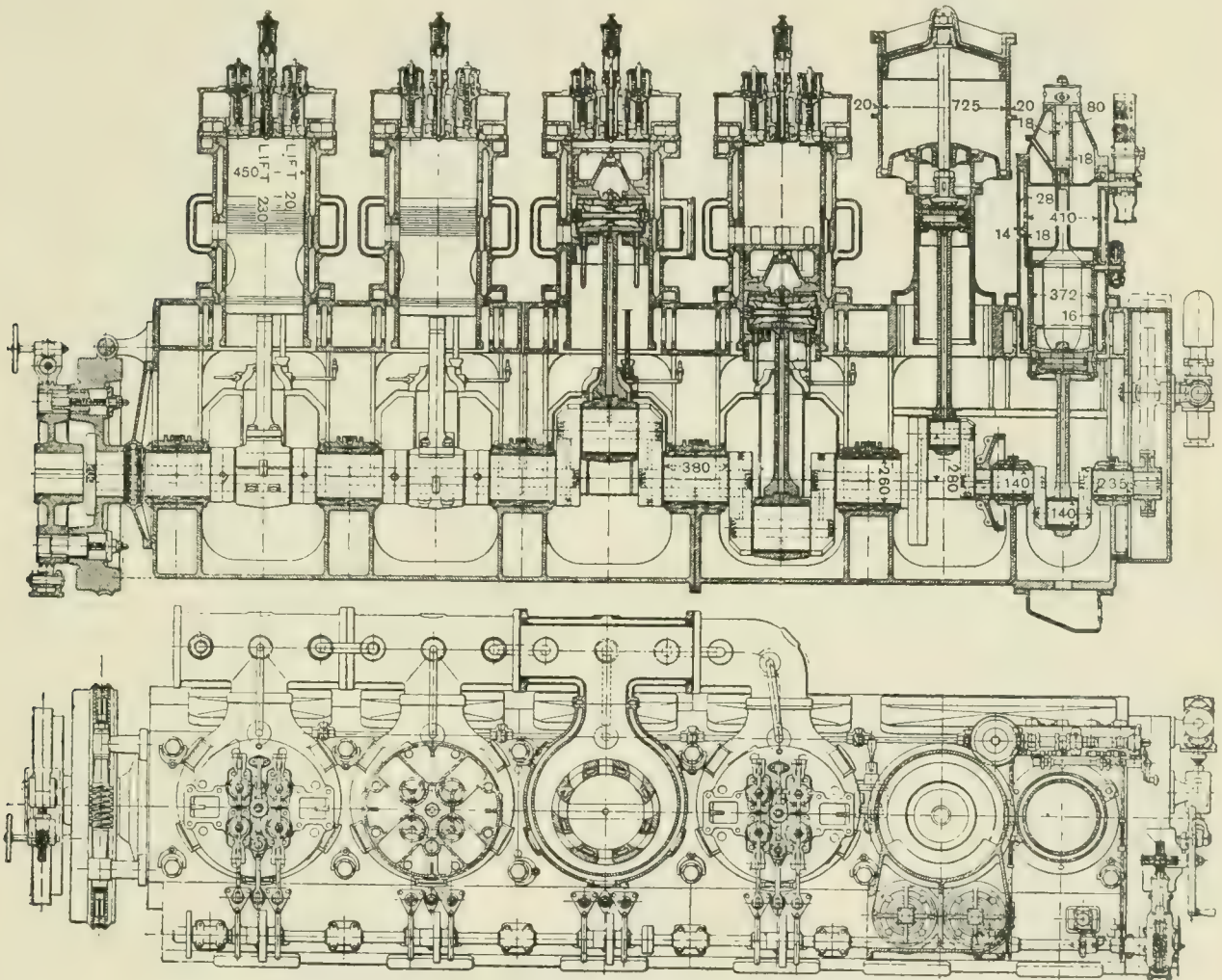
DEVELOPMENT OF INTERNAL-COMBUSTION ENGINES FOR MARINE PURPOSES.

(Continued from page 53.)

Improvements in Working Parts.

STARTING AND MANŒUVRING GEAR.—This has been applied to all the latest engines with a view to make starting and reversing as easy and as quick as possible. There are two cams for operating each

continue to bear on their main cams, so that according to the distribution required it is possible when starting to connect all the cylinders to the compressed-air supply, and then by adjusting the manœuvring cams to cut the air off from one or more of the cylinders and feed one or more with fuel as required. The adjustment to the manœuvring cams is made by revolving the cam-shaft, and one complete revolution of the shaft, worked by hand through a reducing gear, or by a servo-motor, is sufficient to start the engine. In the position corresponding to "stop," all valve lever rollers



Figs. 1 and 2. 900 h p. Two-stroke Cycle. For cargo boat *France*.

valve on the main cam-shaft, one for ahead and the other for astern running. The rocking levers are, however, also controlled by cams fixed to a manœuvring cam-shaft, and these cams are adjustable, so that in certain positions the rocking levers are thrown completely out of gear with the main cams. Thus one can see that by making adjustments to the cams on the manœuvring cam-shaft certain valve levers will be thrown out of gear, whereas others will

be free, so that in order to change from ahead to astern drive all that is needed is to move the manœuvring cam-shaft to the stop position, and then to move the main cam-shaft longitudinally so as to place the "astern" cams under the valve lever rollers, and then start the engine as explained above. This operation, which only takes 10 to 15 seconds, is made by successively rotating two small hand wheels placed side by side, one after the other. A safety device prevents the main cam-shaft moving longitudinally until the other cam-shaft is moved to the "stop" position. The whole arrangement is remarkably safe.

*Read by M. Drosne of Messrs. Schneider & Co., Paris.
Translated.

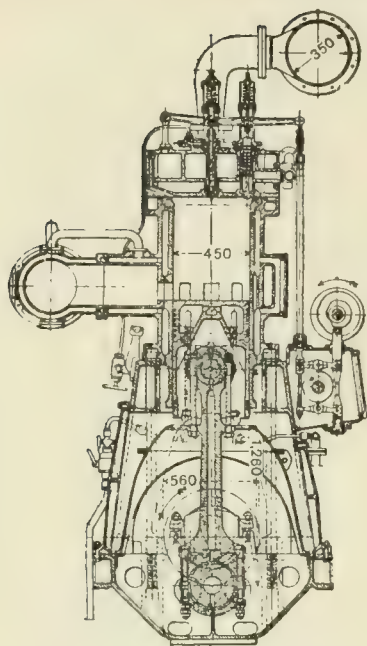


Fig. 3.

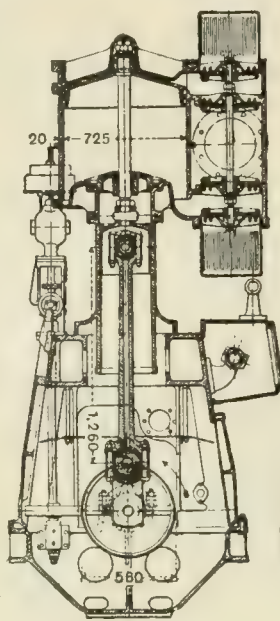
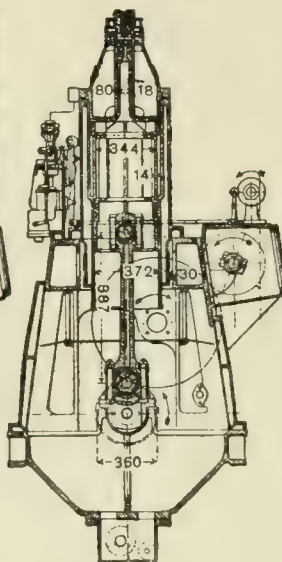
Fig. 4.
900 h.p. Two-stroke Cycle (Cargo boat *France*)

Fig. 5.

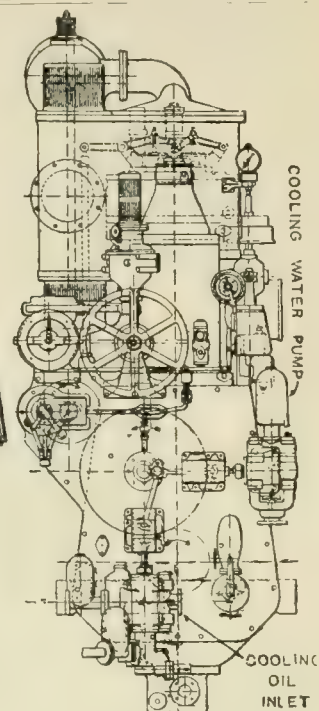


Fig. 6.

VALVES.—The exhaust, air inlet, and starting valves, Figs. 1 and 7, are of the ordinary type, except that they are provided with a special device to prevent their falling into the cylinders if their rods break. The fuel valves are either of the ordinary type, that is, direct-acting straight needles passing through a stuffing-box, or of the Swedish type, balanced and worked by rotation.

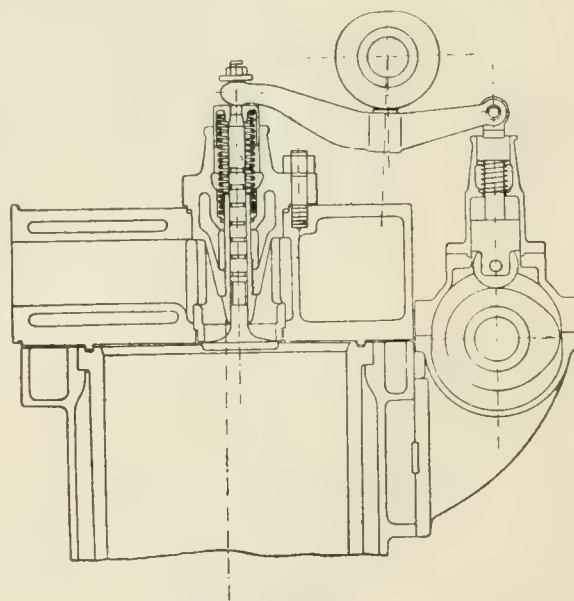
Fig. 9 shows the cross section of a cylinder belonging to a four-stroke cycle engine, of eight cylinders and 510 h.p. The fuel-valve casing is fitted at the bottom with a ball pulverizer and a multiple-hole diffuser. The ball pulverizer distributes the fuel in a very uniform manner with the air that is injected, though it offers but little resistance to the passage of that air, owing to the balls being round. On the other hand, the multiple hole diffuser allows the mixture to be sent in the required direction so as to distribute it evenly in the compression chamber, thus preventing it from being injected on to any one part that might get injured.

FUEL PUMPS.—One pump is provided for each cylinder. The plungers are specially constructed so as to render them perfectly tight. Each oil pump is regulated by varying the amount of lift of its suction valve, and the special feature of the gear for giving this variation is as follows: (1) hand regulation; (2) regulation from the manoeuvring cam-shaft; (3) regulation by overspeed. The hand regulator, which works on a quadrant, serves to regulate the speed or load on the engine. The regulation from the manoeuvring shaft comes into play when starting ahead or astern, so that the pumps begin to work at the right moment only. Lastly, the speed limit device acts so as to prevent racing.

AIR COMPRESSORS.—The air compressors, Fig. 5, either independent or combined with the scavenger

pumps in the two-stroke cycle engines, Fig. 8, are three-stage compressors and are worked direct off the crank-shaft. Their valves, which are of special steel, extra light and with short lift, are designed so as to give large openings. Their coolers, which are multi-tubular or of the coiled single-tube type, are fitted with large water-jackets, and ensure the most efficacious cooling.

SCAVENGING PUMPS.—According to the speed, the scavenging pumps, which are worked off the crank-shaft, are provided with Hoerbiger valves or cylindri-

Fig. 7
Distributing Valves

cal slide valves. Fig. 5 shows a pump fitted with Hoerbiger valves. Fig. 8 shows a cross section of a pump with cylindrical side valves, and combined with its compressor, of which it forms the low- and intermediate-pressure part. The slide valves are driven by eccentrics fixed on the main cam-shaft. A sliding sleeve with feather enables the cam-shaft to move longitudinally for ahead or astern drive without affecting these eccentrics.

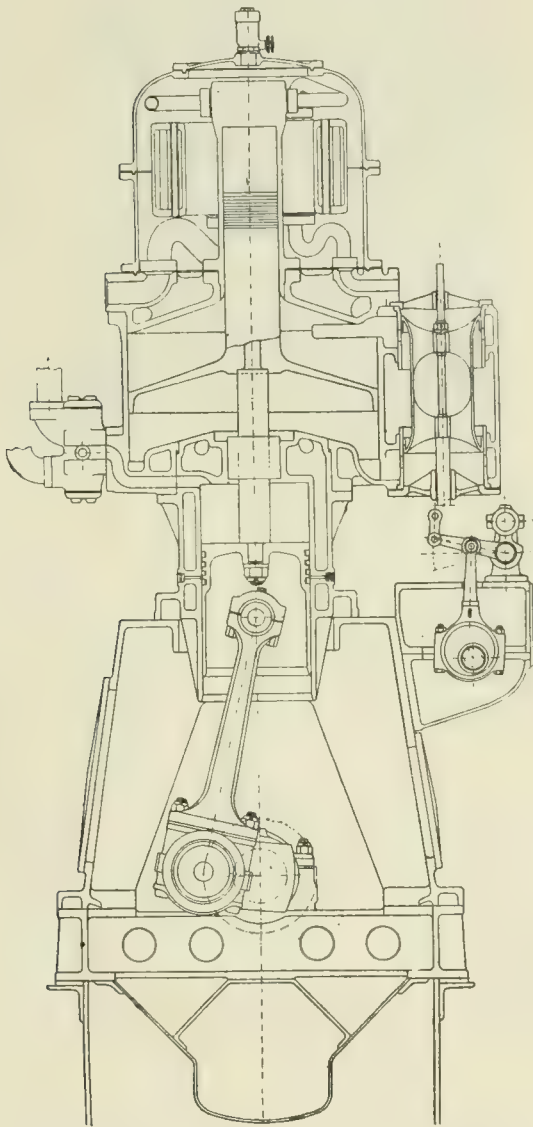


Fig. 8.
Pump with Compressor for Diesel Marine Engine.

OIL-COOLED PISTONS.—The pistons are in two parts, joined together by long bolts, in which tubes carrying the cooling oil work telescopically, Fig. 3 and Fig. 9. The piston-head carries segments in cast iron or steel, which bear lightly against the central part of the body of the piston. The telescopic tubes are provided at the bottom with a swivel joint, leaving them free to move in any direction, and maintaining a proper oil tightness. The hot oil is returned from

the piston to a filter, whence it is pumped by a special pump through a tubular cooler and back into the pistons.

FORCED LUBRICATION. SPLASH GUARDS.—The bearings of the crank-shafts and of the connecting-rods have forced lubrication. This is an excellent arrangement for efficient lubrication, but the splashing of oil by the cranks is undesirable for the following reason: the oil thrown on to the cylinder walls is sucked past the piston, which causes waste, and its partial combustion causes a smoky exhaust. These defects are now got rid of by means of special splash guards. These, Fig. 3, are very efficacious.

Fig. 10 shows a section through one of the six cylinders of a 1,500-h.p. engine for a cargo boat, of the four-stroke cycle type, and of low speed, which

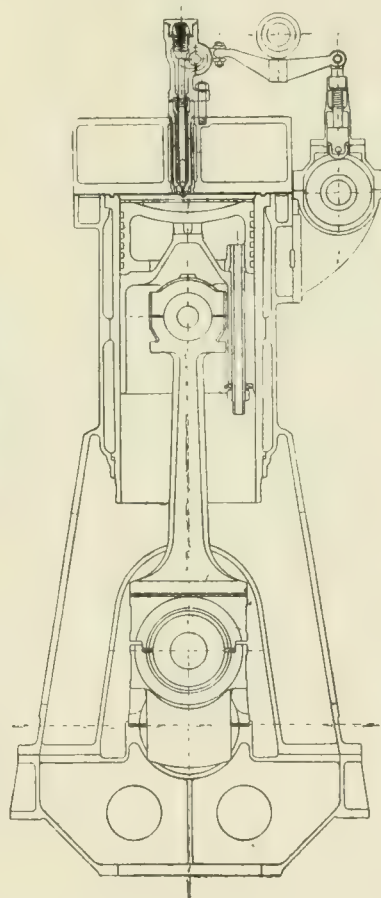


Fig. 9.
510 h.p. Diesel Engine
for a Steamboat.

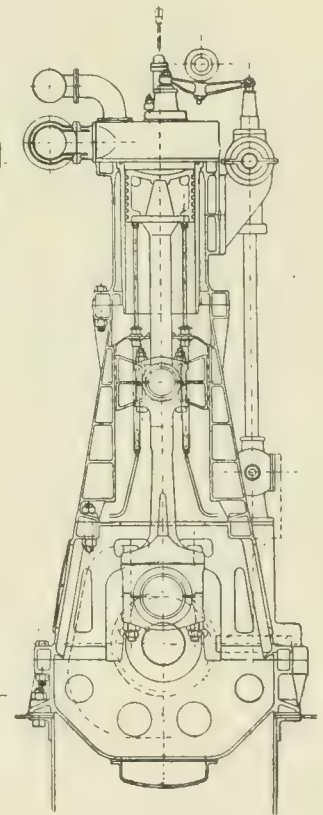


Fig. 10.
1,500 h.p. 6-cylinder, 4-stroke
Cycle Engine for a Cargo boat.

is now being designed. The pistons are provided with rods and cross heads, and they are cooled by water circulation. The frames joining the cylinders to the bed-plate are made in two halves, bolted together and arranged so that one half can be easily removed to allow the connecting rod, piston and cross-head to be taken out. The same arrangements apply to this motor as have been already described above.

OBITUARY.

Sir Stephen Furness, Bt.

It is with deep regret we report the untimely end of Sir Stephen Furness, Bart., Chairman of Messrs. Furness, Withy and Co., and other large mercantile organizations. The deceased baronet was staying at an hotel at Broadstairs and occupied rooms on the fifth storey. At about one o'clock on the morning of the 6th of September, while opening the window, he appears to have lost his balance and falling to the pavement, a considerable distance below, he was killed instantly. He was forty-two years of age and a nephew of the late Lord Furness, who as Sir Christopher Furness was his predecessor in the parliamentary representation of the Hartlepoons. Sir Stephen married in 1899 a daughter of Mr. Matthew Forster, of Adelaide, South Australia, and is succeeded in the titles by his eldest son, Christopher, who is in his fourteenth year. The burial of the deceased gentleman took place at Cundall, a place for which he had a great liking and in which he spent a large part of his boyhood, on the 9th of September, in the presence of a very large gathering.

Captain George Mitchell.

We regret to have to place on record the death of Captain George Mitchell, of the Anchor liner *Castalia*, the sad event occurring on September 10th on board the vessel named whilst she was proceeding through the Red Sea on her homeward passage from Bombay, and engaged as a transport ship in Government service. Notification of Captain Mitchell's death came officially to his friends through the Admiralty, but no details have yet been received of the cause of death. Deceased, who was between sixty-eight and seventy years of age, was a native of Peterhead, his father being closely associated with the trade of that port and manager of a fairly large fleet of fishing vessels. Brought into close contact with seafaring matters from his earliest years, Captain Mitchell naturally took up the seafaring profession, after passing some years on sailing vessels in which he made voyages to all parts of the world. Having turned his attention to and qualified in "steam," Capt. Mitchell in 1872, when twenty-six years of age, entered the service of the Anchor Line. He was for a time junior officer on the *Ethiopia*, and two years after joining occupied the position of second officer of the *India*. His natural aptitude for the profession was early demonstrated and this was quickly recognised by those in authority, so much so that within eight years of his joining the Company he was appointed to the command of one of their large steamers. During the subsequent thirty-four years he has commanded most of the principal vessels of the Line, and in 1912 he joined the *Castalia*. Captain Mitchell took a very active interest in the work of the Mercantile Marine Service Association, having joined the body twenty-two years ago, and in October, 1912, he was elected a member of their executive council. He leaves a widow, a daughter and four sons, who reside at Uddingston, near Glasgow. One of the sons is a lecturer on engineering in Glasgow University, another is a civil engineer in Canada, and the other two are in business in Glasgow.

John Clarke, Senr.

We deeply regret to report the death at Hull on July 20th, after a lingering illness, of John Clarke, senr., Principal of the North-East Coast Engineering Works, Hull. Mr. Clarke was born on the 20th of August, 1850, at West Pelton, Co. Durham. After his school days he was apprenticed to the engineering trade with Messrs. Joicey, of Forthbank, Newcastle. At the age of twenty-one he was sent by this firm to Oran, Algeria, Africa, to superintend the fitting up of a large sparto-grass plant, and when the work was completed he took over the management, this position being held by him for four years, until unfortunately the place was burnt down. After leaving Oran, he opened the Blaydonburne Forge, Blaydon-on-Tyne, which he carried on for five years, but at the outbreak of the Egyptian War he went out to Alexandria. Returning to England he joined the Wilson-Line of steamers as a sea going engineer, leaving this line to join the East Indian Mutual Line of steamers. Finally leaving sea life he became manager of the Northern Marine

**John Clarke, Senr.**

Engineering Works, South Shields, where he remained for four years and then went to the Hull Central Dry Docks, Ltd., as outside manager. After this latter position he became superintendent engineer (Northern District), R.M.S. Packet Co., resigning this post to open the North East Coast Engineering (Works), Ltd., on his own behalf with the assistance of his two sons, who are now carrying on the business. Mr. Clarke was a gentleman who at all times commanded the respect of all whom he came in contact with and he will be greatly missed by all his many friends.

Arthur Doxford.

Our deepest sympathy is extended to the family and friends of Mr. Arthur Doxford, whose death occurred on the September 3th. He was a son of Mr. Robert Doxford and nephew of Sir Theodore Doxford, and at the time of his death held a directorship in the well-known shipbuilding firm of that name in Sunderland. He had been in bad health for some time prior to his death. The burial took place at Bishopwearmouth on the 8th of September, a large number of friends and officials and workmen of Messrs. W. Doxford and Sons attending. The deceased gentleman leaves a widow and small family.

Captain John H. Jellicoe.

The news of the death of Captain Jellicoe, father of Admiral Sir John Jellicoe, now in supreme command of the British naval forces in the North Sea, will be received with sincere regret. The deceased captain, who had reached the ripe age of eighty-nine years at the time of his death, at Ryde, on September 7th, had been associated with the Royal Mail Steam Packet Company for nearly three-quarters of a century, having entered the service of the Company in 1841 at the age of sixteen. He was Commodore of the Royal Mail Fleet for many years and retired from active service about twenty years ago, shortly afterwards being offered a seat on the Board of the Company which he accepted, and was thus owing to his long association with the Company in a unique position to render valuable service to his colleagues. Captain Jellicoe was held in great respect by all who knew him. He leaves a widow, two sons and two daughters, the younger son being our gallant Admiral in the North Sea.

BOARD OF TRADE EXAMINATIONS.

AUGUST 27th, 1914. LONDON.—1st Class: E. Eke, T. Hudes, H. Hood, W. Johnson, F. Smith, A. Steers. 2nd Class: C. Looker.

DOVER.—2nd Class: F. Pain.

NORTH SHIELDS.—1st Class: J. Annan. 2nd Class: W. Lee, A. Neish, R. Wilkens, R. Wraith.

SUNDERLAND.—1st Class: J. Burns, C. Moore, G. Robinson, P. Walton. 2nd Class: C. King.

LIVERPOOL.—1st Class: W. Littledale, W. Revill. 2nd Class: H. Baker, H. Betts, H. Pringle, H. Robertson.

ABERDEEN.—1st Class: A. Burnett. 2nd Class: J. Mackie.

BRISTOL.—1st Class: W. Briddon, R. Woodward. 2nd Class: O. Watkins.

GREENOCK.—2nd Class: F. Baines, W. Hardie, A. Strachan.

HULL.—2nd Class: E. Grubb, S. Smith.

SEPTEMBER 3rd, 1914.—LONDON.—1st Class: G. French, H. Johnson, M. Macaulay. 2nd Class: G. Bell, J. Holmes, G. Mollison.

LEITH.—1st Class: W. Allan, C. Barlow, T. Bell. 2nd Class: J. Drummond.

GLASGOW.—1st Class: T. McNie, J. Mandér, J. Smith. 2nd Class: J. Maclean, J. Marshall, W. Ross, J. Watt.

NORTH SHIELDS.—1st Class: R. Atkinson, J. Lewis, J. Monkhouse, H. Sketch. 2nd Class: C. Talbot, A. Thompson, E. Watson.

LIVERPOOL.—1st Class: W. Bridge, J. Connell, J. Gibson, W. Hetherington, J. Lightfoot, F. Lloyd, G. Rivers, A. Sibbald, J. Tate. 2nd Class: J. Evans, A. Hotchkiss, W. Jones, J. Scott, G. Watson.

SOUTHAMPTON.—1st Class: E. Mason, R. Whitehouse. 2nd Class: H. Paskins, C. Reade.

BELFAST.—1st Class: A. Crosbie. 2nd Class: C. Dempsey, W. Montgomery.

CARDIFF.—2nd Class: H. Hudd, A. Manly, R. Smith.

SEPTEMBER 10th, 1914.—LONDON.—1st Class: J. Baker, C. Massey. 2nd Class: J. Brown, A. Hall, T. Hill, G. Page, H. Ranger.

DUNDEE.—2nd Class: D. Fyfe, G. Knowles, J. Ness.

HULL.—1st Class: B. Dales, F. Hudson, H. Vickers.

NORTH SHIELDS.—1st Class: G. Charlton, G. Laing, R. Watson, J. Wright, J. Yule. 2nd Class: J. Emmanuel, R. Irving, W. Key, C. Landreth, F. Letouze.

LIVERPOOL.—1st Class: W. Brown, J. Coleman, J. Jones, J. Steel. 2nd Class: H. Flenk, P. Forbes, D. Griffiths, W. McCarthy, A. Parkinson, M. Whelan, R. Whittaker, R. Wilson.

DUBLIN.—1st Class: W. Nelson.

GREENOCK.—1st Class: J. Moir, F. Newton, G. Vernon. 2nd Class: A. Auld, H. Crate, A. Dryburgh, J. Hendry, J. McKay, J. Smyth.

SEPTEMBER 17th, 1914.—LONDON.—1st Class: W. Hulbert, N. McCallum, J. McLean, J. Richardson. 2nd Class: F. Shephard, D. Summers.

SOUTHAMPTON.—2nd Class: H. Smith, F. Stewart.

GLASGOW.—1st Class: N. Green, J. Macrone, T. Porter. 2nd Class: A. Anderson, T. Carruthers, W. Duncan, N. Fisher, H. McLean, R. Melville, A. Marshall, J. Munro, J. Smith, R. Todd.

WEST HARTLEPOOL.—1st Class: J. Burke, G. Calvert, T. Lamb, V. Morrison, G. Mosley, T. Stanley. 2nd Class: D. Henry, J. Pratt.

LIVERPOOL.—1st Class: J. Bowie, C. Finn, T. Guthrie, W. Rutherford. 2nd Class: J. Cornwell, A. Mills.

LEITH.—1st Class: A. Gibson, M. Halcrow, N. Livingstone. 2nd Class: H. Brown, A. Husband, R. Milne.

CARDIFF.—1st Class: C. Lee. 2nd Class: W. Edmunds, W. McIntosh, T. Meredith, A. Rosser, D. Thomas.

NORTH SHIELDS.—1st Class: J. Marshall, H. Orr, J. Walker, T. White. 2nd Class: A. Burrows, E. Holmes, W. Kent, H. Land, H. Lee, S. Rance.

S.E.A. RINGS.

MESSRS. Ronald Trist & Co., Ltd., of 4, Lloyd's Avenue, London, E.C., have sent us particulars of what are stated to be the only official tests of packings on record. Carried out by the National Conservatory of Arts and Crafts, Paris, a week or two before the war, the marked superiority of S.E.A. Rings tested in comparison with first, Plaited Asbestos packing, for steam stuffing boxes, and second, Plaited Cotton packing, for hydraulic stuffing boxes was very apparent and certainly a cause for great satisfaction as S.E.A. Rings are of British design and manufacture.

The tests were carried out on a special apparatus, designed and built by the authorities, which consisted in the main of a cylinder with stuffing-boxes at either end, in which moved a steel rod traversing the cylinder from end to end and at the same time rotating on its axis. In the case of the steam tests this apparatus was connected with a small boiler giving steam at the required pressures. In the case of the hydraulic tests it was connected with a hand-pump which allowed it to be kept full of water at the required pressures. Readings were obtained by means of a dynamometer. The tests with their results are tabulated below:—

TEST No. I.

Description.	Units.	Results	
No. of tests		1	2
Packing		Plaited asbestos.	S.E.A. rings
Total amount of friction per packing	Kg.	51.3	19.3*
Friction per cm. of the circumference of the rod	Kg.-cm.	3.28	1.23
Average linear speed	M.-sec.	4	4
Pressure of steam	Kg.-cm. ²	8	8

* This shows a reduction in rod friction of 260% in the case of S.E.A. rings.

JUDGES' REMARKS.—*Plaited Asbestos.*—The screwing-up of the glands was stopped when they were as steamtight as was practicable. Slight steam leakage could still be seen, however.

S.E.A. Rings.—After the glands had been screwed up tightly they were then loosened. No steam leakage was apparent at any time.

TEST No. II.

Description.	Units.	Results	
No. of tests		1	2
Packing tested		Plaited cotton.	S.E.A. rings.
Total amount of friction per packing	Kg.	141.6	28.3*
Friction per cm. of the circumference of the rod	Kg.-cm.	6.64	1.86
Average linear speed of rod	M.-sec.	3	3
Pressure of water	Kg.-cm. ²	8	8

* This shows a reduction in rod friction of 300% in the case of S.E.A. rings.

JUDGES' REMARKS.—*Plaited Cotton.*—It was not possible to make the glands absolutely watertight. The screwing-up of the glands could not be continued on account of the rod becoming heated through friction and binding.

S.E.A. Rings.—After the glands had been screwed up tightly they were then unscrewed until almost quite loose. There was no leakage at any time and no binding of the rod.

Industrial and Trade Notes.

THE CLYDE AND SCOTLAND.

(From our own Correspondent.)

The War and Clyde Shipbuilding.—In the Clyde shipyards and engineering shops the general effect of the war has been to make the majority of the establishments busier than usual. In the case of the yards where naval work is being done the firms continue to devote themselves specially to the completion of vessels already launched, utilizing for this purpose the services of considerable numbers of workmen transferred from yards where merchant ships only are on hand. The arrangement made between the Clyde Shipbuilders' Association and the different trade unions for the unrestricted transfer of men to naval yards is working exceedingly well, and there have been practically no interruptions of labour anywhere since the declaration of war, while the men in all the yards are doing their best to keep work going smoothly and efficiently. Large numbers of workmen in the yards and engineering shops have enlisted in Lord Kitchener's new army and in the Territorials, and there is thus employment for all remaining. Apart from the naval situation altogether there seems to be sufficient work to last throughout the winter and longer. The large shipyards at Clydebank and Dalmuir are well supplied with mercantile as well as naval work. In Dumbarton the vessels on hand in the two large yards there are mostly for home and Colonial owners, while the firms are understood to have booked some new contracts recently. If they do start short time it will be rather through lack of materials than lack of work, or to spread the work over as long a time as possible. In Greenock and Port Glasgow yards work on hand is normal in extent, but as a proportion of the orders are to Austrian and Dutch account work on them has somewhat slowed down.

Launches in September.—Although full returns are not available at time of writing the output of new shipping on the Clyde during September has been far above the average for the period. It will be found to reach, if it does not exceed, 53,000 tons, accounted for to a large extent by vessels which should under ordinary circumstances have been sent off in August, whose output of only 15,500 tons was an exceptionally low figure. The nine months' output will probably reach 352,000 tons. Four of the vessels included in the September output were important liners: the *Tuscania*, of 14,000 tons; the *Minho*, 10,000 tons; the *Merka*, 8,500 tons; and the *Tsushima Maru*, of 8,250 tons. Details will be found in our Launches section. To take their places on the vacated berths orders are in hand for one or two new vessels, but scarcely any contracts have been booked during September.

East Coast of Scotland Yards.—Excepting that staffs have been reduced somewhat owing to workmen enlisting, and that the trawler building yards are less active, operations have been well maintained since the declaration of War. Since the notes were written which appeared in our August issue quite a fair number of new contracts have been booked. Messrs. Ramage and Ferguson, Leith, who launched in September the *Chakdina* a steamer of 3,100 tons for the B.I.S.N. Company have contracted to build a cargo steamer of goodly dimensions for the Ellerman Lines. The Dundee Shipbuilding Company have, it is stated, received an order for as many as six powerful trawlers from a firm at Fleetwood. The Caledon Shipbuilding Company, Dundee, have booked an order for a passenger steamer of 245 ft. in length from the Aberdeen, Newcastle and Hull Steamship Company.

Big Wharf Crane for Dundee.—The Dundee Harbour Board have unanimously resolved to have a harbour crane of 120-ton power erected upon a new wharf to be constructed on the river Tay. This decision is the result of long protracted representations by shipbuilders, and more particularly of recent negotiations by the Caledon Shipbuilding and Engineering Co., Ltd., to have facilities provided to enable them to place boilers and machinery on vessels of a larger type than the company has hitherto built; orders for which, in fact, they have had to decline owing to the insufficiency of present crane facilities. In view, however, of the present European crisis it has been decided to defer the work until the present financial situation is clear. The new river wharf on which the 120 ton crane will be erected will cost £11,000,

and the crane between £9,000 and £10,000. The Caledon Company, it should be added, in addition to paying crane dues, will be responsible for an annual payment of 3 per cent. on the capital cost.

THE TYNE AND WEAR.

The Tyne.

(By our Own Correspondent.)

THERE has been a considerable readjustment of work in the shipbuilding yards on the Tyne. The crying need is for able and skilful men to speed up the enormous amount of work needed by the Admiralty. All classes of builders willingly joined in the effort to forward the Naval work, and in addition to the great depletion of men due to enlisting, the yards which are engaged in purely commercial work have suffered by the withdrawals of men who have gone to the yards where Admiralty work is in progress, at Palmers', at Hawthorn, Leslie & Co.'s, and at Elswick and Walker yards of Messrs. Armstrong, Whitworth & Co. There is no perceptible unemployment. Indeed, although 3,000 men came nearly a month ago from different points on the North-East Coast the great Elswick firm are still advertising for all classes of men.

The Admiralty has written to the employers and Trades Unions on the Tyne and Wear thanking them for their loyal response and agreement to forward by every means the work of the Navy. Those works which are engaged in motor engineering are in that department as busy as the naval yards in turning out Government work.

Mr. Daniel Kemp has succeeded Mr. J. W. Reed, as general manager of Palmers' Company at Jarrow. He came from the engine department of Messrs. John Brown & Co.'s Clydebank Works. Mr. A. Macfarlane has been appointed chief assistant, Mr. Wm. Brown outside manager, and Mr. H. Fullerton, who also came from Clydebank, has been made assistant manager.

With so much idle shipping and the fear of German mines it is hopeless to anticipate much new work. Still steady, if slow, progress is being made on commercial bottoms.

The Wear.

The Wear, in the displacement of labour and its removal to the Tyne, where workers are keenly needed, will not suffer at present because there is naturally under the present circumstances no anxiety to get the vessels on which Wear builders are engaged, completed early. Two of the Wear firms have booked new contracts, but it is perhaps needless to add that these were booked before the outbreak of war. Sir James Laing & Co. have received an order for two oil-tank steamers for Messrs. H. E. Moss & Co., Liverpool, and Messrs. Joseph L. Thompson & Sons, Sunderland, an order for a cargo steamer of 7,000 tons for an Ardenal firm.

THE HUMBER AND DISTRICT.

(From our own Correspondent.)

Hull Docks and Riverside Quay.—The arrivals of grain cargoes from India and Plate ports are exceedingly good, when we consider the great crisis we are now passing through. The coal trade is again coming on nicely. It is a pity to see the large number of vessels now in the Town Docks, many of them with cargo on board, for Antwerp, Rotterdam, Hamburg and Ghent. The owners of these Continental steamers and crews are the sufferers and it is to be hoped that they will soon start running, more especially the Rotterdam, Antwerp and Ghent steamers, as a number of seamen and others are out of employment. The "Wilson Line" Atlantic, Indian and Mediterranean steamers keep working away, but the firm have a considerable number of their fleet sealed up in certain ports. All coasting steamers from Hull to London and the north seem to be working very regularly every week. There is a great number of fishing vessels and trawlers in the Fish Dock; many of the crews prefer to stay at home rather than risk their lives in the North Sea, with the many mines floating about. At least twelve trawlers have come to grief and a number of lives

have been lost by these mines, but it is pleasing to know that a considerable number of trawlers are working on the North Sea, mine sweeping, and with great success. The vessels lying in the Hull and Grimsby Docks must represent a very large amount of capital and a great loss to owners.

Hull.—The different engineering works are very busy with repairs and building engines and boilers, etc., for steamers building at the different shipyards on the Humber. Some of the establishments are working night and day to compete with the orders contracted for. Several of the works are short of apprentices, through the recruiting campaign, and there is drilling going on at the different drill halls and fields to make the recruits efficient for duty, whenever they may be called for. The Lord Mayor and Corporation have given the City Hall for use of recruiting purposes, and all clerks and workmen employed by the Hull Corporation, if they join the Service, receive full pay whilst the war lasts. A large number have joined. A number of Belgian refugees have come to the city from Antwerp and surrounding districts, to make their home here during the war, and a number of the men have got work.

SOUTH OF ENGLAND AND ISLE OF WIGHT.

(From our Own Correspondent.)

Southampton.—On the 12th of last month the Admiralty announced their intention of opening this port for commercial traffic. With the exception of one day, the port has been closed since the despatch of the Expeditionary Force to the Continent, and the only traffic permitted by the Admiralty has been the L. and S.W. Railway Company's services to France and the Channel Islands, and even this service has been very much curtailed. All the large liners have been diverted, some to Liverpool, and others to London, and the only vessels using the quays are those engaged in the transport of troops, etc. This state of affairs at the docks has caused much suffering among the dockers. Local relief authorities are doing their best to cope with the distress. The shipping companies are hoping to revert to their usual sailings, but it will be a long time before these are resumed on anything like the scale existing before the outbreak of the war. The following vessels have been seized and are detained in the docks here:—S.s. *Pentwyn*, s.s. *Hanna Larsen*, and the steel yacht *Germania*, owned by Dr. Krupp. The L. and S.W. Railway inaugurated a new service last month between Southampton and St. Nazaire (Brittany). The sailing days will be Mondays, Wednesdays and Fridays, and will be taken by the *Normannia* and *Hautonia*.

THAMES.

(From our Own Correspondent.)

Work in the Docks.—Work on the river is brisk. The docks are flourishing and August and September, usually quiet months, have been this year exceptionally busy. The Admiralty have taken over a large number of ships for transport purposes and the fitting out and supplying them with coal and stores has been a great performance. Most British companies trading in the port have been utilized for the service. Then as the Continental ports are in many cases barred at present the ships come here, and that tends to make the Thames busier than usual. The Tilbury Docks have been perhaps more busy than any other owing to their position and the size of steamers that can be accommodated therein. Tugs, too, have been very busy in the towing of Government stores by barge. The Surrey Docks have been requisitioned for holding imprisoned German ships taken in the vicinity.

Steamship Lines.—The Mail companies have maintained their sailings from the port as usual, the P. & O. sailing on Saturdays. The British India Co. has just launched a

vessel at Glasgow, named the *Merhava*. There have been numerous adventures of ships using the port, an important one being that of the *Galician*, which was surprised by the *Kaiser Wilhelm der Grosse*, armed as a cruiser, since sunk by a British warship. The P. & O. Co. have had to take extreme precautions against the raid of the cruiser *Emden* in the Indian Ocean, but on the whole our big ships have fared well, due to our command of the sea.

Defence of the Thames.—During the month the Admiralty has issued orders for the closing of certain channels in the approaches to the Thames. Vessels from abroad have to call at the new pilot station established in the vicinity of the Tongue Lightship, or at one of the pilot stations, *viz.*, Sunk Light Vessel, Margate, Deal and Dover, to be conducted to their destination by a licensed pilot. The same with outgoing vessels. The fact that the Thames estuary is very broad between Sheerness and Shoeburyness, about $5\frac{1}{2}$ miles, necessitates care to prevent enemy's ships using the river. By restricting the channel of approach the risk of danger is avoided, while not preventing us getting all advantage for commercial purposes.

The Baltic Mercantile Shipping Exchange.—The Exchange has a great deal to do with Russian trade and in view of the victories achieved by the Empire, the chairman and members have reciprocated congratulations with the Bourse, Petrograd, and these were of the heartiest character.

MERSEY AND MANCHESTER SHIP CANAL.

(From our own Correspondent.)

THE Port of Liverpool has once more resumed a more normal aspect, and there is a scene of activity on the river with its many inward and outward bound liners. An unusual sight recently was the departure of the *Olympic*, of the White Star Fleet.

The Red Star Line have diverted their fine steamers from Antwerp and until more peaceful conditions, these vessels will make Liverpool their port of departure for New York.

On September 19th Sir Ernest and Lady Shackleton sailed from Liverpool on board the *La Negra*, of the British and Argentine Steam Navigation Co.'s Fleet. Some seventy dogs also for the South Polar Expedition were housed on the main deck in temporary shelter. Sir Ernest's vessel, the *Endurance*, will receive the dogs at Buenos Ayres, where also the gallant Commander will join the vessel. Lieut. F. A. Worsley, R.N.R., late of the Allan Line, commands the *Endurance*, whilst A. L. A. Mackintosh, R.N.R., late Junior Assistant Secretary of the Merchant Service Guild, commands the *Aurora*, which leaves Australia towards the end of November for McMurdo Sound, to assist the Shackleton party coming from the opposite side.

Messrs. Cammell, Laird & Co.—This yard has been fitting out transports, etc. New naval work now in hand is being expedited to the utmost. It is understood that new orders for British naval work have also recently been placed, details of which at present cannot be given. The steamer *Kalyan* was launched on September 19th, this being the fourth similar vessel recently constructed for the P. and O. Company. The *Cuidad De Buenos Ayres*, recently ran her trials upon the Clyde to the entire satisfaction of the owners, Messrs. Mihanovitch. Her sister vessel is now fitting out at Birkenhead.

The Canadian Ice Breaker and Car Ferry *Leonard*, constructed by Messrs. Cammell, Laird & Co., for the Transcontinental Railway Co., has safely reached Quebec after a successful voyage. This vessel left Liverpool three days prior to the declaration of war.

Canadian Pacific Railway Co.—The *Empress of Ireland*.—The Yankee Salvage Association of New York have been successful in recovering the purser's safe containing a large amount of silver bullion, also seven bars of silver. It appears likely that all the silver bullion will be raised in time, as also the mail, a large portion of which has now been recovered. The recovery of the bodies is also proceeding. The Quebec

Seam n's Institution have forwarded £1 19s. 6d. each to nearly 100 survivors and dependents of the crew of the lost vessel.

The White Star Line.—Liverpool having done well in its share of forming new corps for Service, the managers of the White Star, American and Dominion Lines have on their part offered to carry free of charge supplies of clothing, comforts, etc., for the use of the Territorial corps at any port within these companies' sphere of operation. Colonel Concannon, joint manager of the above companies, has been appointed a member of the Audit Commissioners of the Dock Board, in the place of Mr. J. Bruce Ismay, lately retired.

Cunard Line.—The *Mauretania* and *Lusitania* have resumed their sailings from this port whilst the Boston and Canadian services are also being maintained. The *Aquitania* is receiving at time of writing repairs to her stem incurred in collision with the Dominion liner *Canadian*.

The Liverpool Wireless Association.—This Association, which has several members now serving in the Forces, is devoting its energies chiefly to research work, since all private stations are just now closed by order.

The St. Lawrence Route.—The Department of Marine, Ottawa, has now definitely decided upon different courses for vessels of large and small draught using the narrower reaches of the river. A suggestion to this effect was put forward by the Mersey Commission, but this scheme was previously under consideration, and will come into force with the opening of navigation next year.

Loss of Liverpool Liners.—Amongst several Liverpool owned vessels which have been sunk or captured by the enemy may be mentioned the new *City of Winchester*, of the City Line, which was captured on August 6th, off Socotra, whilst the *Hvades*, of the Houston Line, was sunk 180 miles off Pernambuco while bound from Rosario to Rotterdam with a cargo of maize. The officers and crew of the latter were landed at Rio de Janeiro.

Liverpool Engineering Society.—The new session which opens on November 4th will, it is expected, be devoted to subjects of special interest with reference to the war. The Hon. Secretary and Hon. Treasurer are both now serving their country; their places will be filled by members of the Council.

NORTH-WEST OF ENGLAND.

(From our own Correspondent.)

Barrow-in-Furness.—The shipbuilding and engineering trades are very busily employed in the district surrounding Barrow. All departments are thronged with work, and overtime is being put in in all departments. A very large increase in the number of men employed at Messrs. Vickers' works is to be noted, and even a still larger number of men could be employed if it were possible to get them, but although there has been a falling off in activity in many commercial shipyards, and although a very large number of men have been drawn to the shipyard of Barrow in consequence, there is room for plenty more men if they could be got. The difficulty is one of house accommodation. The Corporation of Barrow have decided not to propose any building scheme which will place round the neck of the municipality any large outlay of money. They think the necessity for an increase in the number of houses should be shouldered by private ownership, but overlook the fact that since Messrs. Vickers bought the Naval Construction and Armament Works at Barrow a much surer strong position has been given to Barrow than was previously possible. The position has become so difficult of late that the big employers of labour, together with the Mayor of Barrow, have been in conference as to the best means of meeting the position, and it has been determined to approach the Local Government Board with a view of getting help under the Housing Act, 1914. A deputation has gone from Barrow to interview the Local Government Board on the question, and it is hoped the result will be that this authority will be willing to agree to the issue of a loan at a small rate of interest with the view of getting over the present difficulty.

LAUNCHES AND TRIAL TRIPS.

THE TYNE AND WEAR.

Wm. Dobson & Co., Newcastle-on-Tyne.

WILLASTON. Launch, August 27th. This vessel, building to the order of Messrs. John Edgar & Co., of Liverpool, is being constructed to the highest class in Lloyd's Register. Both hull and machinery are under the supervision of Messrs. Flannery, Baggallay & Johnson, Ltd., of London, Liverpool and Rotterdam. Of the shelter-deck type, her principal dimensions are:—Length between perpendiculars 400 ft., breadth 52 ft., and depth moulded 27 ft. 7 in., and she is designed to carry a large cargo on light draught. Besides a powerful steam windlass and steam-steering gear, she is fitted with nine large winches with helical gearing and all modern appliances for the rapid handling of cargo. Her engines are of the triple-expansion inverted type by Messrs. The North-Eastern Marine Engineering Co., and have cylinders 26 in., 42 in. and 70 in. by 48 in. stroke, and all pistons are fitted with patent rings, as is also the high-pressure piston valve. Steam at 180 lbs. pressure is supplied from three large single-ended boilers. The vessel is well supplied with auxiliary machinery, including separate feed pumps, feed heater and filter, winch condenser and a large evaporator. A separate circulating pump of the centrifugal type and powerful ballast pumps are being fitted. Electric light is fitted throughout, including five large cargo clusters, and provision has been made for fitting a wireless telegraph installation if required.

Wm. Doxford & Sons, Ltd., Sunderland.

ANDREAS. Launch, September 4th. Large steamer, built to the order of Messrs. A. A. Embricos & Co., London and Athens. The length of the vessel is 440 ft., breadth 55½ ft., and moulded depth 30 ft. Deadweight capacity, 10,400 tons. Classification is with British Corporation.

SAN NAZARIO. Trial Trip, September 5th. This vessel ran a successful trial trip at sea, a speed of 11½ knots being attained. The vessel is specially designed for the oil trade, and carries 15,600 tons deadweight, and is a sister ship of the s.s. *San Jeronimo*, which Messrs. Doxford delivered to the same owners, namely, the Eagle Oil Transport Co., recently. For Launch, see July issue.

Jos. T. Eltringham & Co., Ltd., Willington Quay.

JOHN DONOVAN. Trial Trip, August 24th. Everything proved highly satisfactory on the official trial trip of the vessel. The engines, which have also been constructed by the builders, worked with the greatest smoothness, and the contract speed was greatly exceeded. For Launch, see July issue.

HERCULES. Trial Trip, September 1st. The trial of this tug and salvage steamer proved highly satisfactory in every way, after which the vessel returned to the yard of the builders to be prepared for the voyage to Mexico, where she is intended to be employed in connection with the large fleet of tank steamers owned by the Mexican Eagle Oil Company. For Launch, see July issue.

Sir James Laing & Sons, Ltd., Sunderland.

STOCKWELL. Launch, September 7th. Steel screw steamer. Dimensions:—Length, 425 ft.; breadth moulded, 53 ft. 6 in.; depth moulded to upper deck, 33 ft. Built to the order of The Well Line, Ltd. (of which Messrs. Tyzack & Bramfoot are the managing owners), of Newcastle, to take the highest class at Lloyd's, the vessel has been specially designed for their Colombo, Madras and Calcutta service, and special attention has been paid to the ventilation and fire-extinguishing arrangements of the ship, with a view to reducing to the greatest possible extent, the risk of damage to valuable cargo. The ship is constructed on the deep frame system, and has large hatches and open holds for the carriage of bulky goods, and her discharging gear includes eleven steam winches and eighteen derricks. The 'tween decks are specially high, and made suitable for the carriage of horses. The machinery, which has been supplied by Messrs. The North-Eastern Marine Engineering Co., of Wallsend, consists of quadruple-expansion engines, having cylinders 25½ in., 36 in., 52½ in. and 70 in., with a stroke of 54 in., steam being supplied by three large steel boilers, with a working pressure of 220 lbs. per square inch.

Northumberland Shipbuilding Co., Ltd., Howdon-on-Tyne.

CANNIZARO. Launch, September 4th. Steel screw steamer for Messrs. Thos. Wilson, Sons & Co., Ltd., Hull. The vessel has been specially designed for Eastern trade and built to the highest class at Lloyd's. She is built on the deep frame and girder system, rigged as a two-masted schooner, and is fitted with all the latest improvements and up-to-date appliances to make her in every way a first-class liner. She is about 435 feet in length, with two complete steel decks, including the shelter deck all fore and aft, with a cargo-carrying capacity of about 10,000 tons. A large quantity of water-ballast is carried in the cellular double bottom and fore and after-peak tanks, which, with the bunkers, will put the vessel in excellent trim, irrespective of cargo. The shelter 'tween deck is of exceptional height, and is arranged so that a large number of emigrants can be carried. Loading and discharging facilities are considerably in excess of usual. The steamer has eleven derricks and ten powerful steam winches with extended shafts by Messrs. John Lynn & Co., Ltd., Sunderland, to ensure the most expeditious handling of cargo. Powerful combined steam and hand-steering gear on the Wilson Pirrie principle, by The Carron Co., Stirlingshire, will be fitted in steel house on shelter-deck aft and actuated from amidships by telemotor gearing, and a powerful steam windlass of the latest type by Messrs. Emerson, Walker and Thompson Bros. The vessel has been built to a fine model and to include the most modern improvements, including Board of Trade Regulations. Triple-expansion machinery of special design and construction will be supplied by Messrs. Earle's Shipbuilding & Engineering Co., Ltd., Hull, with extra large pressure boilers, the indicated horsepower being about 2,500, the working pressure 180 lbs.

Osbourne, Graham & Co., Sunderland.

NIEUWLAND. Trial Trip, August 22nd. Steel screw steamer, specially constructed to the order of The Shipping and Coal Co., of Rotterdam. The engines have been supplied by The North-Eastern Marine Engineering Co., Sunderland, and on the trial everything was very satisfactory, a speed of 10½ knots being easily attained. After the trial the vessel proceeded into the Tyne to load her first cargo. For Launch, see August issue.

Palmers' Shipbuilding & Engineering Co., Ltd., Hebburn-on-Tyne.

CITY OF FLORENCE. Launch, Sept. 3rd. Steel screw steamer, built to the order of the Ellerman Lines, Limited. The vessel is about 422 ft. long, and will carry a deadweight of nearly 9,000 tons. She is to be classed 100 A1 Lloyd's, and has a cruiser stern and two complete decks, with poop, bridge and forecastle. Accommodation with saloon is provided in large deck-house at fore end of bridge-deck, with captain's and chart-room in house above. Special attention has been given to the derrick arrangement for the quick handling of the cargo, and the vessel has thirteen steam winches. The *City of Florence* is to be fitted by the builders with triple-expansion surface-condensing engines of 48 in. stroke. Very ample boiler power is provided.

J. Readhead & Sons, Ltd., South Shields.

WESTOE HALL. Launch, September 5th. Steel screw steamer, built to the order of Messrs. Edward Nicholl & Co., Cardiff. The dimensions of the vessel are:—382 ft. by 51 ft. by 27 ft. 8½ in., and she will carry a large deadweight and measurement cargo on a light draught of water. She is of the improved single-deck type with large clear holds, long bridge amidships, poop and forecastle, and is built to Lloyd's highest class and under their special survey. There is an adequate outfit of winches and derricks at large hatchways for rapid handling of cargo for grain and general trades, and there is also large capacity for water ballast on light passages. The vessel is to be fitted with triple-expansion engines and large boilers, also constructed by Messrs. John Readhead & Sons, Ltd., the cylinders being 26 in., 42 in., 60 in. by 48 in. stroke.

Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

VITA. Launch, August 24th. Twin-screw steamer for the British India Steam Navigation Co., Ltd., for their service between India and the Persian Gulf. Dimensions:—390 ft. length by 53 ft. beam by 26½ ft. depth, and she has accommodation for first and second-class passengers, together with space for a large number of native passengers. The

propelling machinery is being built by Messrs. Swan, Hunter and Wigham Richardson, Ltd., at their Neptune Works, and consists of two sets of triple-expansion engines, with six large boilers of sufficient power for a speed of 16 knots. The auxiliary machinery is very complete, and includes eight steam winches, steam warping winch, steering gear, capstan and windlass, electric light and ventilation, a wireless telegraphy installation and refrigerating machinery.

CLAN ROSS. Launch, September 4th. Steamer, built for the Clan Line Steamships, Ltd., managed by Messrs. Cayzer, Irvine & Co., Ltd., of Glasgow. The vessel is built with a cruiser stern, and is 445 ft. long over all, with a moulded breadth of 54 ft. and a depth of 32 ft. The engines, which are being supplied by the builders, are of the direct-action triple-expansion surface-condensing type, and drive a single propeller. Three single-ended boilers will be installed in the ship, and they will work under forced draught.

WOOLGAR. Launch, Sept. 5th. Steel screw cargo and cattle steamer for the Melbourne Steamship Company, Ltd., of Melbourne, Australia. The vessel is 350 ft. in length by 47 ft. beam by 33 ft. depth to shelter-deck, and is designed for carrying a deadweight of about 5,400 tons. The shelter-deck is fitted for the carriage of about 190 head of cattle, with large cattle doors, and there are rooms for stockmen in attendance.

TEES AND THE HARTLEPOOLS.**Wm. Gray & Co., Ltd., West Hartlepool.**

NIRVANA. Launch, September 3rd. Steel screw steamer, built for The British India Steam Navigation Co., Ltd., London. The vessel, which will take the highest class in Lloyd's Register, has a Board of Trade passenger certificate, and is of the following dimensions:—Length overall, 463 ft. 6 in.; breadth, 56 ft., and depth, 29 ft. 8 in. She is fitted with wireless telegraphy and an electric light installation throughout. The hull is built with deep frames, cellular double bottom and after and fore-peak ballast tanks. The whole of the outfit, including sanitary tanks, fresh-water distiller, steam windlass, steam-steering gear, fourteen uprights with derricks, fifteen winches exhausting into winch condenser of the "Cmew" type is of the most approved description. Triple-expansion engines are being supplied by The Central Marine Engine Works of the builders, having cylinders 28 in., 46 in. and 77 in. diameter, with a piston stroke of 54 in., and four large steel boilers adapted for 180 lbs. working pressure per square inch, and fitted with Howden's system of forced draught. The engine-room auxiliaries are very complete, and include evaporator, feed and ballast pumps, independent feed pumps combined with a gravitation filter, centrifugal pump, feed-water purifier, overhead direct contact heater and oil separator, all of the "Cmew" type.

CHILKANA. Trial Trip, September 5th. Steel screw steamer, built for The British India Steam Navigation Co., Ltd., London. A very satisfactory trial was effected, the vessel afterwards proceeding to Middlesbrough to load. For Launch, see August issue.

Irvine's Shipbuilding & Dry Docks Co., Ltd., West Hartlepool.

CHEVIOT RANGE. Launch, Sept. 7th. Steel screw steamer, built to the order of Messrs. Furness, Withy & Co., Ltd., for the Neptune Steam Navigation Co., Ltd. The dimensions of the vessel are:—362 ft. by 51 ft. 0½ in. by 26 ft. 3 in., having a deadweight carrying capacity of about 6,640 tons. She is built to Lloyd's highest class on the shelter-deck principle, having two complete steel decks and a topgallant forecastle, and water-ballast is carried in cellular double bottom and fore and after peaks. The vessel is constructed with deep frames without side stringers, giving exceptionally clear holds for the stowage of bulky cargoes. Wood grain divisions are fitted throughout the holds to Board of Trade requirements, and the vessel is divided into seven watertight compartments by six transverse bulkheads. Four large hatches are provided, with nine powerful steam winches worked from a multitubular donkey boiler and exhausting into a winch condenser, and all the latest improvements are included for the rapid loading and discharging of cargo. A powerful quick-warping steam windlass is fitted forward, and steam-steering gear amidships with hand screw

gear aft. A large ice-house is also fitted for the crew's provisions, etc. The lighting, ventilating and sanitary arrangements have received special attention, the most improved methods having been adopted throughout. The machinery, which has been constructed by Messrs. Richardsons, Westgarth and Co., Ltd., Hartlepool, consists of a set of "Richardsons" standard triple-expansion engines, having cylinders 25 in., 40 in. and 67 in. by 45-in. stroke, with two large boilers, 180 lbs. pressure. The condenser is of the "Contraflo" type, with air pump temperature regulator, and the engine-room auxiliaries include a cascade filter, Morison evaporator, large ballast donkey and harbour feed donkey, etc.

Richardson, Duck & Co., Ltd., Stockton.

BURFORD. Launch, Sept. 10th. Steel screw steamer, of the following dimensions, *viz.*:—Length overall, 364 ft. 3 in.; breadth extreme, 50 ft. 3 in.; depth moulded, 25 ft. 3 in.; tonnage, gross, about 3,650; deadweight, about 6,470 tons. The vessel, which has been built to the order of Messrs. Burdick & Cook, of London, will class 100 A1 in Lloyd's Register, and has been built under special survey. She is of the single-deck type, and has a cargo poop, long bridge amidships. A cellular double bottom throughout and forward and after-peak tanks are fitted for water-ballast, and equipment includes large horizontal multitubular donkey boiler, six steam winches, steam-steering gear, steam windlass with quick-warping ends, stockless anchors and all modern improvements for facilitating loading and discharging. The engines, by Messrs. Blair & Co., Ltd., have cylinders 24 in., 40 in. and 66 in. by 45-in. stroke, steam being supplied by two single-ended boilers having a working pressure of 180 lbs.

Sir Raylton Dixon & Co., Ltd., Middlesbrough.

TAHCHEE. Trial Trip, Sept. 14th. Steamer, built to the order of the Tank Storage and Carriage Co., Ltd., of London. The trial trip of this steamer passed off successfully and the vessel will sail from the Tyne under the command of Captain T. R. McKay. For Launch, see September issue.

Tyne Iron Shipbuilding Co., Willington Quay.

ESSEX BARON. Launch, Sept. 19th. Steel screw steamer, built to the order of Messrs. Meldrum & Swinson, of London. The vessel is built to class 100 (A.1) in Lloyd's Register under special survey, with single deck laid and is of the following dimensions, *viz.*:—Length overall 397 ft., breadth extreme 51 ft., depth moulded 27 ft. 2 in., having a long bridge, poop and topgallant forecabin, and is designed to carry 7,500 tons on a light draught. A large quantity of water ballast is carried all fore and aft in five tanks on the cellular double bottom principle, also in after peaks. The vessel is constructed on the deep frame principle with six steel bulkheads giving exceptionally clear holds, with large hatchways for the carriage of bulky cargoes, having a steel centre line bulkhead with shifting boards in way of hatchways to meet the requirements of the Grain Cargoes Act. Special attention has been given to the quick discharge of cargo, a large "Riley" donkey boiler and six powerful steam winches being fitted with eleven derricks resting on posts and masts. A quick warping windlass is fitted forward for working cables, and hand and steam steering gear amidships controlled from Upper Bridge. The sanitary and ventilating arrangements are effected on the latest improved principle to meet the British Board of Trade requirements. Triple-expansion engines 26 in., 43 in., 71 in., by 48-in. stroke with two single ended boilers 16 ft. diameter by 12 ft. long, 180 lbs. working pressure with Howden's forced draught, the machinery being supplied and fitted by Messrs. George Clark, Ltd., Sunderland.

THE HUMBER.

Cochrane & Sons, Ltd., Selby.

FRASCATI. Launch, August 25th. Steel screw trawler, of the following dimensions:—120 ft. by 21 ft. 6 in. by 12 ft. 3 in. moulded, and built to the order of The Strand Steam Fishing Co., Ltd., Grimsby. Powerful triple-expansion engines will be fitted by The Great Central Co-operative Engineering and Ship Repairing Co., Ltd., Grimsby.

LEMBERG. Launch, August 25th. Steel screw trawler. Dimensions, 129 ft. 8 in. by 22 ft. by 13 ft. 10 in. moulded,

built to the order of The Lindsey Steam Fishing Co., Ltd., Grimsby. Powerful triple-expansion engines will be fitted by Messrs. Amos & Smith, Ltd., of Hull.

LONGSET. Launch, September 7th. Steel screw trawler. Dimensions, 129 ft. 8 in. by 22 ft. by 13 ft. 10 in. moulded, built to the order of The Lindsey Steam Fishing Co., Ltd., Grimsby. Powerful triple-expansion engines will be fitted by Messrs. Amos & Smith, Ltd., of Hull.

OROPESA. Launch, September 8th. Steel screw trawler. Dimensions, 140 ft. by 24 ft. by 13 ft. 3 in. moulded, built to the order of Mr. A. Bannister, of Grimsby. Powerful triple-expansion engines will be fitted by Messrs. C. D. Holmes & Co., Ltd., of Hull.

NORTH-WEST OF ENGLAND.

Cammell, Laird & Co., Birkenhead.

CUIDAD DE BUENOS AIRES. Trial Trip, Sept. 15th. The speed trials of this vessel, the first of two built at Birkenhead for the Argentine Navigation Company (Nicolas Mihanovich) Limited, were carried out on the Clyde, when the speed obtained was greatly in excess of that provided for in the contract, *viz.*, 18 knots. This vessel is the first geared turbine steamer built for South American waters. For Launch, see June issue.

SOUTH OF ENGLAND.

Phillip & Sons, Ltd., Dartmouth.

PIRAE. Trial Trip, Sept. 11th. Twin-screw passenger steamer, built to the order of the Crown Agents for the Colonies. A successful trial at sea was carried out. For Launch, see September issue.

SCOTLAND.

Barclay, Curle & Co., Glasgow.

MERKARA. Launch, September 7th. Twin-screw steamer, built for The British India Steam Navigation Company. The vessel is 464 ft. in length, 58 ft. in breadth, 36 ft. in depth, and of 8,500 tons gross. She will have accommodation amidships for eighty-three first-class and forty second-class passengers. The first-class dining saloon, on the upper deck, is a large and airy apartment. At the fore end of the promenade deck are the first-class music and smoking rooms. The corresponding rooms for the second-class are at the aft end of this deck. These first-class rooms are constructed with large oriel windows—a departure which is a prominent feature of all modern passenger vessels. The state-rooms for both classes are fitted out very elaborately in order to give a maximum of comfort. On the bridge-deck there are a number of single-berth rooms, fitted with brass bedsteads. The vessel will be propelled by twin-screws driven by triple-expansion surface-condensing engines, supplied with steam from five single-ended boilers working under Howden's forced draught. The vessel is designed for a speed of 13½ knots.

Charles Connell & Co., Scotstoun.

MAHANADA. Launch, Sept. 10th. Built to the order of Messrs. Thomas and John Brocklebank, Liverpool, for the Anchor-Brocklebank Line, is of 7,300 tons gross. The vessel will be fitted with Parsons geared turbines by Messrs. David Rowan & Co., Glasgow. The hull and machinery are being constructed under the supervision of Messrs. G. S. Goodwin and Co., Liverpool.

John Cran & Co., Leith.

CRAIG ISLAND. Launch, August 24th. Steam trawler, built for the Leith Steam Fishing Company, Edinburgh. The dimensions of the vessel are:—Length, 115 ft.; beam, 22 ft., and depth, 12 ft. 8 in. She will be fitted with triple engines by the builders.

Wm. Denny & Bros., Dumbarton.

BURMA. Launch, August 22nd. Single-screw steamer, built to the order of Messrs. P. Henderson & Co. The vessel's dimensions are:—Length, 465 ft.; breadth, 58 ft., and depth (moulded), 33 ft. 2 in.

Dunlop, Bremner & Co., Port Glasgow.

POSEIDON. Launch, Sept. 16th. Single screw steamer built to the order of the Koninklijke Nederlandsche Stoomboot Maatschappij, Amsterdam, for their general cargo trade. The vessel is 295 ft. in length, 43 ft. in breadth, and 29 ft. 6 in. in depth, and is of about 1950 tons gross. She will have triple-expansion engines, constructed by the builders, having cylinders 22 in., 35 in., and 59 in. respectively, with a stroke of 39 in. Steam will be supplied by two large single-ended boilers, fitted with Schmidt's superheaters, working in conjunction with Howden's forced draught.

John Fullerton & Co., Paisley.

WILLIAM MASON. Launch. Steel screw-steamer, of about 500 tons deadweight, built to the order of Messrs. Wm. Mason & Co., Liverpool. It is the pioneer vessel for the lately formed Mason Shipping Company of that port, and is intended for the coast and Channel trade. Compound engines of 400 i.h.p. are being supplied by Messrs. Fishers, Paisley.

Greenock & Grangemouth Dock Co., Ltd.

CUYAHOGA. Trial Trip, August 29th. The speed trials of this new tanker, built for the Anglo-American Oil Company, Ltd., London, were carried out on the Firth of Clyde. A mean speed of $12\frac{3}{4}$ knots for six hours was maintained, everything working smoothly to the entire satisfaction of all concerned. The dimensions of the vessel are as follows:—Length, 376 ft. by 53 ft. 3 in. by 23 ft. draught, with a carrying capacity of 6,550 tons of oil in twenty-three oil tanks. The vessel has been built to the highest class at Lloyd's under special survey, and in accordance with the latest practice for this class of work. There is a complete installation of pumping machinery for the rapid handling of the oil cargo. Heating coils have been fitted throughout the cargo tanks to facilitate the rapid discharge of the very heaviest grades of oil. The vessel has a complete outfit of deck machinery and electric light throughout, and is fitted with Marconi wireless telegraphy. Machinery, placed aft, has been supplied and fitted by Messrs. Dunsmuir & Jackson, Ltd., Govan, and comprise a set of triple-expansion engines, having cylinders 27 in., 44 in. and 73 in. diameter by 48 in. stroke, supplied with steam from three large boilers.

A. Hall & Co., Ltd., Aberdeen.

TRAWLER. Launch, August 22nd. Trawler built for a French firm, of the following dimensions:—130 ft. long, 23 ft. broad and 13 ft. deep. Steam-steering gear, steam wireless and wireless telegraphy installation will be fitted by the builders, and there is extra large crew accommodation.

Hall, Russell & Co., Aberdeen.

KATHLEEN BURTON. Launch, Sept. 10th. Trawler, built to the order of Messrs. R. H. Davidson and Company, Hartlepool. The vessel, which will take the highest class in Lloyd's register, is of the following dimensions:—Length, 115 feet; breadth, 22 feet; depth, 12 feet 9 inches. Triple-expansion engines will be supplied by the builders.

Jeffrey & Co., Alloa.

WHITESTONE. Launch. Cargo steamer. Dimensions 100 feet in length, 20 feet in breadth, and 9 feet 9 inches in depth. The vessel is the first of two which the firm have on hand for Messrs. Martin, Barrowman & Co., Glasgow. She is intended for traffic between Scotland and Ireland. Machinery is to be fitted by the builders at their yard.

Murdoch & Murray, Ltd., Port Glasgow.

CORRIB. Launch, September 3rd. Steel coasting steamer of the following dimensions:—Length, 167 ft.; breadth, $26\frac{1}{2}$ ft.; depth, 12 ft. 8 in. The vessel is of the usual coaster type, built to a very full specification, and is to the order of Messrs. John Kelly, Ltd., Belfast. During construction the vessel and machinery have been superintended by Messrs. J. H. MacIlwaine & Son, Belfast. Triple-expansion engines and boiler will be fitted on board by Messrs. Ross and Duncan, Govan.

SANTO AMARO. Launch, September 4th. Steel twin-screw steamer, built to the order of Messrs. J. G. Kincaid & Co., Ltd., Greenock, for service in Bahia. The principal dimensions are:—Length, 135 ft.; breadth, 25 ft.; depth moulded, 10 ft. This vessel is a duplicate of the *Cachoeira* built earlier in the year by the same builders, and which sailed for Bahia at the end of July.

Russell & Co., Port Glasgow.

TSUSHIMA MARU. Launch, September 8th. Steamer, for the Nippon Yusen Kaisha of Tokyo, Japan. The vessel, which is fitted with all auxiliaries for a first-class cargo steamer, is 445 ft. in length between perpendiculars, 58 ft. in moulded breadth, and 34 ft. in moulded depth. Messrs. David Rowan & Co., Glasgow, will supply the machinery.

Scott's Shipbuilding & Engineering Co., Greenock.

MENTOR. Launch, September 5th. Cargo and passenger steamer, built to the order of Messrs. Alfred Holt & Co., Liverpool, for their Eastern service. The dimensions of the vessel are:—Length, 470 ft.; breadth, 56 ft.; depth, 35 ft. 3 in., with fore-castle, long bridge and poop. While primarily designed for cargo carrying, the deadweight capacity being about 10,000 tons, accommodation is provided for natives and for a limited number of first-class passengers. The arrangements for handling cargo are of a very complete description, there being twenty-four derricks serving seven hatches and worked by seventeen winches of special design and heavy type. One of the derricks is capable of lifting 45 tons. The construction is on the girder system, leaving the holds clear for the stowage of cargo. The accommodation for first-class passengers is in houses on the bridge-deck. The machinery consists of a set of triple-expansion engines and boilers, the diameter of the cylinders being 31 in., $51\frac{1}{2}$ in. and 86 in. respectively, with a stroke of piston of 5 ft. The speed will be 15 knots.

Alex. Stephen & Sons, Glasgow.

TUSCANIA. Launch, September 4th. Twin-screw, geared turbine steamer, built for the Anchor Line (Messrs. Henderson Brothers), Glasgow. The vessel is 567 ft. in length, 66 ft. 6 in. in breadth, 45 ft. in depth, of about 14,000 tons gross, and 20,000 tons loaded displacement. She will have accommodation for about 2,500 passengers—350 first-class, 150 second-class, and about 2,000 third-class. The machinery installed is of special interest, as it and that of her sister ship the *Transylvania*—launched at Greenock in May—are the first installations of geared turbines to be fitted in large Transatlantic vessels. The *Tuscania* is propelled by twin screws, each driven by turbines of the Parsons type working through reduction gearing. The gear wheels are about 10 ft. diameter and 5 ft. broad, and are driven by two turbines working in series and running at about 1,500 revolutions per minute. An astern turbine of the impulse reaction type is incorporated with each low-pressure ahead turbine, the arrangement being such that either the high-pressure turbine or the low-pressure turbine can be used independently. Thus the derangement of one turbine will not prevent the vessel proceeding with twin screws. The boiler installation consists of six large double-ended Scotch boilers, working under natural draught at a pressure of 200 lbs. The machinery has been constructed by the builders to the requirements of the Board of Trade and British Corporation Registry, and also to the American and Italian laws. The *Tuscania*, along with the *Transylvania*, is intended for the Mediterranean-New York service. The steel decks in passenger state-rooms, saloons, lounges, smoking rooms, writing rooms, engineers' and officers' accommodation are covered with "Tenax" deck composition by Messrs. W. Briggs & Sons, Ltd., Dundee. The entire bunkers, engine and boiler-rooms, and ballast tanks in way of same, are coated throughout with Messrs. Briggs' bituminous enamels and solutions.

IRELAND.**Workman, Clark & Co., Ltd., Belfast.**

PYRRHUS. Launch, August 25th. Steamer, built for the Ocean Steamship Company, Ltd., Liverpool (Messrs. Alfred Holt & Company). The *Pyrrhus* is 472 feet in length, with a gross tonnage of about 7,400, and is constructed on the girder system, ensuring increased strength, combined with unobstructed cargo space in the holds. The cargo space is divided into four large holds and two smaller compartments, which can be used either for cargo or as deep water-ballast tanks. Accommodation for a number of saloon passengers is arranged in comfortable state-rooms; also for steerage passengers in the fore-castle, while the 'tween decks are so arranged that they can be readily adapted for the accommodation of Eastern emigrants. The ventilation of the passenger

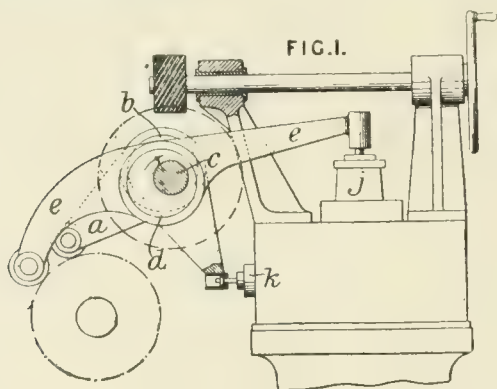
spaces has received careful consideration, and an efficient installation of hot water heating has been provided. The propelling machinery consists of a set of triple-expansion engines with the necessary auxiliary appliances supplied with steam from two double-ended steel multitubular boilers working under forced draught, while an auxiliary boiler provides steam for the deck machinery.

EBRO. Launch, September 8th. Built to the order of the Royal Mail Steam Packet Company. The *Ebro*, like her sister vessel, the *Essequibo*, already launched, is intended for the West Indies, Colombia, Panama Canal and New York mail and passenger service. She is 467 ft. long, 58 ft. broad, with a gross tonnage of about 8,500, and has been built under Lloyd's special survey. The vessel is fitted with a complete cellular double bottom, numerous watertight bulkheads and special fireproof divisions. The public rooms and cabins occupy the midship portion of the vessel, and are very commodious. There are state cabins with bathrooms attached, and a large number of single and double-berth rooms fitted with bedsteads; some of these rooms can be engaged *en suite*. The first-class dining saloon can accommodate nearly 200 persons at small tables arranged on the restaurant plan, and is beautifully decorated in the Italian Renaissance style. The second-class accommodation comprises dining saloon, smoking room and social hall. All these are large apartments tastefully decorated and comfortably furnished. There is also ample promenading space. The important matter of ventilation has received special attention, and electric fans are provided throughout the accommodation. The appliances for working the vessel and cargo are of the latest and most approved type. They include noiseless hydraulic cranes at each hatchway, an emergency lighting dynamo driven by oil motor, ample boat accommodation for all on board, wireless telegraphy, submarine signalling and every modern contrivance necessary to the comfort and safety of all on board. The propelling machinery consists of two independent sets of quadruple-expansion engines designed and adjusted so as to reduce vibration and supplied with steam from six steel cylindrical boilers working under forced draught.

Abridgments of New Patents.

Compiled by Messrs. E. P. Alexander & Son, Chartered Patent Agents, 306, High Holborn, London, W.C.

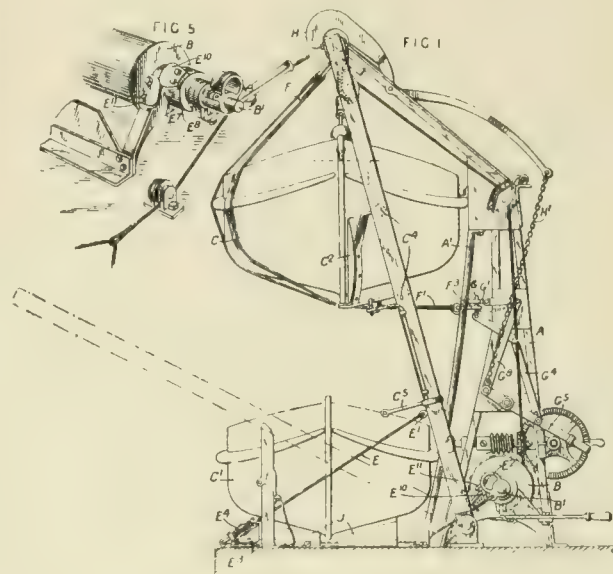
10,206. Starting Internal Combustion Engines.—In an engine started by compressed air and in which compression is increased as the supply of air is decreased, the valve levers



of the starting and compression relief valves are mounted on adjustable fulcras. In the construction shown, the levers *a*, *e* of the compression relief valve *k* and the starting-valve *j* are mounted on eccentrics *b*, *d* on an adjustable shaft *c*.

10,303. Boat Raising, Lowering and Securing Gear.—Davits of the swinging frame type are restrained from inboard

movement when the frame is being luffed outboard by means of ropes *E* attached to the upright members of the frame at *E*¹ and passed over pulleys *E*², *E*³, and finally joined in a single rope which is secured to an extension of the spindle *B*¹ of the winch barrel *B*. The slack in the rope as the frame is luffed is taken up by an eccentric *E*² on the spindle *B*¹ so arranged that the take up of the eccentric is equal to the delivery of the slack. The eccentric is secured to the spindle *B*¹ by means of the clutch *E*⁷, *E*⁸, which is released when the frame is fully outboard by a nose *E*¹⁰ on one element of the clutch bearing against a fixed projection *E*¹¹, thus allowing the winch barrel to pay out the falls. Lashing-bands *F*, which secure the boat *C* in its stowed position are secured by



means of a rope *F*¹ and a ring *F*², which takes over a nose *G* pivoted to the central stanchion *A*. The nose is provided with a mousing-ring *G*¹, and the nose and ring are both moved apart when it is desired to release the bands *F* by operating the handle *G*³, which is connected up to the nose and ring by the links *G*⁴, *G*⁵. Simultaneously a catch *H* which engages the top of the davit frame is released through the pull on a chain *H*¹. Arrangements are made for stowing a second boat *C*² in deck chocks *J* beneath the frame. The half chocks *C*² which support the inboard side of the boat *C* are adapted to be turned on their pivots *C*¹ by the lever *C*³ so as to be out of the way of the second boat when it is desired to handle the latter. The stanchion *A* is provided with front guide-members *A*¹, which steady the boat as it is being raised.

THE PUBLISHERS will be pleased if anyone experiencing difficulty in obtaining copies of this publication, will communicate with them at the offices of the paper at 3, Amen Corner, London, E.C.

MESSRS. W. & G. FOYLE of Charing Cross Road, London, W.C., have recently issued a new edition of their catalogue of technical and scientific books. Copies will be sent to applicants who may obtain new and second-hand books at this store at low prices.

THE Secretary of the Admiralty states that on September 12th H.M.S. *Berwick*, operating in North Atlantic waters, captured the Hamburg-American liner *Spreewald*, of 3,899 gross tons. This vessel was known to be fitted as an armed merchant cruiser. At the same time two colliers were captured, with between them 6,000 tons of coal and 180 tons of provisions, for German cruisers in the North Atlantic.

SMOOTH-ON CEMENTS.

JUST to hand is the Smooth-on Instruction Book No. 15, issued by the Smooth-on Manufacturing Company, of Jersey City, N.J., U.S.A., and 8, White Street, Moorfields, London, E.C., manufacturers of the popular iron cements and compounds. The present publication is the largest and most complete book issued by the Company and it fully describes and illustrates the application of the Company's eight different iron cements, iron concrete paint and coated corrugated iron gaskets. Sixty pages are taken up describing iron cements Nos. 1, 2 and 3, used by the steam engineering trade for making steam screw thread joints, steam flanged joints, and for general repairing purposes. Then follows in order smooth-on castings No. 4, foundry cement for smoothing over rough castings, etc.; smooth-on joints No. 5, for making hub joints on cast iron pipes; rivet cement No. 6, a plastic cement used in structural iron work, etc.; iron cement No. 7, a hydraulic cement for waterproofing, etc.; fire brick cement No. 8, for setting or coating fire bricks; concrete paint, for surfacing concrete to prevent dusting, waterproofing, etc.; corrugated iron gaskets for withstanding steam, water, etc. To all interested a copy of this useful book on smooth-on specialties and when, where and how to use them, will be sent on application to their London Office, at the address given above.

MERCHANT VESSELS COMMISSIONED.

By one of the Hague Conventions Britain has bound herself to publish in her Navy List the names of all vessels commissioned by her as warships. Accordingly in the September Navy List there is a list of the Mercantile Cruisers mobilised at the outbreak of war. They are:—

	Line.	Tons gross.	Year built.	Builders.
1. ALSATIAN, Quad-s.	Allan	18,486	1913	Beardmore, Glasgow.
2. ANGLIA, T.S.	L. & N. W. Rly.	1,862	1900	Denny, Dumbarton.
3. AQUITANIA, Quad-s.	Cunard	45,647	1913	J. Brown, Clydebank.
4. ARMADALE CASTLE, T.S.	Union Castle	12,973	1903	Fairfield Co., Glasgow.
5. CAMBRIA, T.S.	L. & N.W. Rly.	1,842	1897	Denny, Dumbarton.
6. CARMANIA, Trip-s.	Cunard	19,524	1905	J. Brown, Clydebank.
7. CARONIA, T.S.	Cunard	19,687	1905	J. Brown, Clydebank.
8. EMPRESS, Trip-s.	S.E. & C. Rly.	1,695	1907	Denny, Dumbarton.
9. EMPRESS OF ASIA, Quad-s.	C.P. Rly.	16,850	1912	Fairfield Co., Glasgow.
10. EMPRESS OF BRITAIN, T.S.	C.P. Rly.	14,186	1906	Fairfield Co., Glasgow.
11. EMPRESS OF JAPAN, T.S.	C.P. Rly.	5,940	1891	Naval Construction Co., Barrow.
12. EMPRESS OF RUSSIA, Quad-s.	C.P. Rly.	16,810	1912	Fairfield S. B. Co.
13. ENGADINE, Trip-s.	S.E. & C. Rly.	1,670	1911	Denny, Dumbarton.
14. HIMALAYA, S.S.	P. & O. Co.	6,929	1892	Caird's, Greenock.
15. KINFARNS CASTLE, T.S.	Union Castle	9,664	1899	Fairfield Co., Glasgow.
16. MACEDONIA, T.S.	P. & O. Co.	10,512	1904	Harland & Wolff, Belfast.
17. MAIRI, Motor Yacht	Marquis of Graham		1911	Ritchie, Graham & Milne, Glasgow.
18. MANTUA, T.S.	P. & O. Co.	10,885	1909	Caird & Co., Greenock.
19. MARMORA, T.S.	P. & O. Co.	10,509	1903	Harland & Wolff, Belfast.
20. OCEANIC, T.S. (ran on rocks off W. Coast of Scotland)	White Star Line	17,274	1899	Harland & Wolff, Belfast.
21. OSIRIS, T.S.	P. & O. Co.	1,728	1898	Caird & Co., Greenock.
22. OTRANTO, T.S.	Orient Line	12,124	1909	Workman, Clark & Co., Belfast.
23. RIVIERA, Trip-s.	S.E. & C. Rly.	1,675	1911	Denny, Dumbarton.
24. SCOTIA, T.S.	L. & N.W. Rly.	1,872	1902	Denny, Dumbarton.
25. TARA, T.S.	B.I.S.N. Co.	6,322	1902	Denny, Dumbarton.
26. VENETIAN, T.S.	Ellerman Line	2,734	1891	Naval Construction Co., Barrow.
27. VICTORIAN, Trip-s.	Allan	10,635	1904	Workman, Clark & Co., Belfast.

Shortly after the publication of this list there were four additions to the fleet. They comprised the 10,000 ton TEUTONIC, of the White Star Line, the first merchant ship specially built to suit Admiralty requirements. The ORAMA, of the Orient Line. The twin-screw EDINBURGH CASTLE of the Union Castle Line; and the quadruple screw CALGARIAN, sister to the Allan Liner ALSATIAN, already taken up. Captain J. R. Segrave has been appointed to the TEUTONIC. Captain W. R. Napier to the EDINBURGH CASTLE. Captain H. Chatterton to the ORAMA. Captain T. W. Kemp, C.I.M., to the CALGARIAN.

INSTITUTE OF MARINE ENGINEERS.

FOURTEEN candidates sat for the Lloyd's Register Scholarship Examination on July 1st and 2nd. Five districts were represented by the following number of candidates: Glasgow 5, London 4, Liverpool 3, Hull 1, Newcastle 1. Mr. Charles P. Tanner (Graduate), of 30, St. Vincent Crescent, Glasgow (apprentice with Messrs. D. Rowan & Co.), received the highest number of marks, and was awarded the Scholarship for 1914 and 1915. Mr. Tanner would enter Glasgow University on the opening of the Session under ordinary circumstances, but intimation has been received to the effect that he has decided to enlist for the war on active service. The Awards Committee of the Institute have therefore decided to recommend that Mr. Tanner be allowed to take up the scholarship, if he is spared to return, when the war is passed.

A premium of £5, for the purchase of books or instruments, was awarded by the Committee of Lloyd's Register to Mr. C. S. Fraser (Graduate), 1, Tenant Street, Renfrew, who took second place in the examination.

The following meetings have been arranged for October and November:—

Monday, October 5th.—"Gyroscopic Compasses, with special reference to the 'Sea Star' type," by Mr. E. Kilburn Scott.

Monday, October 12th.—Discussion on Fuel Test.

Monday, October 19th.—"Terrestrial Magnetism," by Mr. A. N. Somerscales (Member).

Monday, October 26th.—Discussion on Fuel Test.

Monday, November 9th.—Paper. Subject to be announced later.

Monday, November 16th.—Discussion on Fuel Test.

All meetings commence at 8 p.m. except where otherwise stated.

It has been decided, in view of the crisis in which the country is involved, to cancel the Annual Dinner of the Institute, which was arranged for November 6th.

We are asked to state that an arrangement has been entered into between the Soldiers' and Sailors' Families Association and the Naval Reserves' Relief Committee, under which, on and after the 1st October next, all applications for the relief of dependents of the Royal Naval Reserve and the Royal Naval Volunteer Reserve will be dealt with by the Naval Reserves' Relief Committee. Further information can be obtained on application by letter to the Joint Hon. Secretaries at the offices of the Committee, 2, Paper Buildings, Temple, London, E.C.

BOILER DEFECTS.

(Continued from page 76.)

A FURTHER case was that of a steam drifter on which the furnaces of the boiler collapsed due to shortness of water, the suspicion being that the blow-off cock had been left slightly open and had allowed sufficient water to escape to bring about the disaster. The boiler was constructed of steel, 8 ft. 6 ins. in diameter by 8 ft. in length, having two plain furnaces 2 ft. 8 ins. diameter with separate combustion chambers; the working pressure was 130 lbs. The drifter had left for the herring fishing after an overhaul, and before leaving port the boilers and machinery had been tested. The driver turned in, leaving the fireman on watch, about 1.30 a.m., when the water was near the top of the glass. The driver went on watch at 6 a.m. when the gauge glass indicated $1\frac{1}{2}$ inches of water, and he put on the supplementary feed. As the water did not rise he looked around for the cause. Meantime, at about 8 a.m., his attention was called to the steam pipe covering being overheated and burning, this he quenched with water. The boiler covering then started to smoke and soon afterwards the furnace crowns collapsed and steam escaped into the fire side. New furnaces, a new tube plate with tubes and stays were fitted to make good the defects.

GOVERNMENT WAR INSURANCE SCHEME.

IT is an essential feature of the Government War Risks Insurance Scheme that all insured ships must obey implicitly all orders and directions given by the Admiralty as to routes, ports of call, stoppages, etc.

To avoid misapprehension on this point, the Board of Trade wish it to be clearly understood that this provision is intended to secure the safety of both ship and cargo, and that any deviation which may be rendered necessary in consequence of Admiralty orders or directions is in the interest of the cargo as well as of the ship. It is important that this fact should be borne in mind by all parties concerned in the shipment or carriage of goods on insured ships, and that in contracts of carriage the shipowner's obligation to comply with the Admiralty requirements should be fully recognised.

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T.S.S. "AFRICA"—EXTENSIVE ALTERATIONS TO A PORTUGUESE MAIL STEAMER.—The twin-screw steamer *Africa*, of 5,515 tons register, owned by the Empresa-Nacional de Navegacao of Lisbon, sailed from Middlesbrough-on-Tees in September, after having had very extensive alterations and additions to her passenger accommodation, enabling her to carry 114 first class passengers, 79 second class and 140 third class. The dining room, music room and ladies' lounge have also been overhauled and redecored, besides the machinery having been thoroughly overhauled. This work has been carried out by Messrs. Sir Raylton Dixon & Co., Ltd., of Middlesbrough-on-Tees, who have made a speciality of this class of work, this being the third vessel they have had through their hands with extensive alterations within the factured.

CAPTURED AND DETAINED BRITISH SHIPS.

IN connection with the Government War Risks Insurance Scheme, arrangements are being made between the Board of Trade and the War Risks Associations for the payment of allowances of half wages up to a maximum of £1 a week to the dependants of masters, officers and seamen employed on insured British merchant ships captured or detained by the enemy. The allowances will date back to the beginning of the war, and will continue as long as the officer or seaman is actually prevented by the war from providing for his dependents. The arrangements for the payment of the allowances will be made by the owners of the ships concerned, to whom all applications should be addressed. Should the name and address of the owner of the ship not be known, the information can be obtained at the nearest Mercantile Marine Office. The payments made by the shipowner will be refunded to him by the War Risks Association in which the ship is entered.

BELFAST.

(From our Own Correspondent)

THE war has had an appreciable effect upon shipbuilding and engineering in this district. Two of the large makers of textile machinery had closed their works on account of their business connections on the Continent. It is pleasing, however, to note that one of these, Messrs. James Mackie & Sons, Ltd., has already re-opened its works, and the other, Messrs. Combe Barbour, Ltd., is about to do so.

The Dutch contractors for dredging, mentioned in our August issue, have had to cease all operations and lay up their plant on account of their employees being recalled to Holland to serve in the reserves. Much more serious has been the slacking off of work in Messrs. Harland & Wolff's shipyard, where only two hulls on the stocks are being proceeded with. Thousands of their workmen have been sent to the firm's repair works in Liverpool and Southampton, where, no doubt, their services will be appreciated. Meantime the demarcation questions, and indeed all labour questions, have been shelved until the close of the war. Out of evil sometimes comes good, and the closing up in unity of all ranks has been a splendid feature in the realm.

So far there has been no slacking off in the operations of Messrs. Workman, Clark & Co., Ltd., and in addition to their regular work they have just completed the transformation of the sailing ship *British Isles* into a well-equipped coal hulk, for an Italian firm. The vessel is to sail to her destination abroad, after which her masts and spars will be dismantled.

In other ways the state of war has been brought clearly before us. All our surroundings are in the hands of an officer commanding the defences of Belfast, whose orders have to be obeyed with military precision. All vessels proposing to enter the port have first to communicate with an examination steamer lying near the entrance of the Lough, which, after being satisfied with their identity, provides them with the signal for the day. So rigidly is this system carried out that one passenger steamer, considering it unnecessary, tried to pass up in the early morning and was only brought to her senses by seeing a shot strike the water before her bows.

Two of His Majesty's cruisers were docked here recently, and during their stay the port was rigidly closed to all traffic between the hours of eleven p.m. and five a.m. A military station has been formed at the north end of the East Twin, which is the entrance to the Harbour proper, and here all vessels, passing after dark, are subjected to scrutiny from a strong searchlight. No one is permitted to approach this station except those on duty, and workmen passing certain points after 9 p.m. have to be provided with passes countersigned by the officer named above.

Thousands of men have volunteered for military service, the trained men of the Ulster Volunteer Force being about to be formed into Battalions of the Royal Irish Rifles.

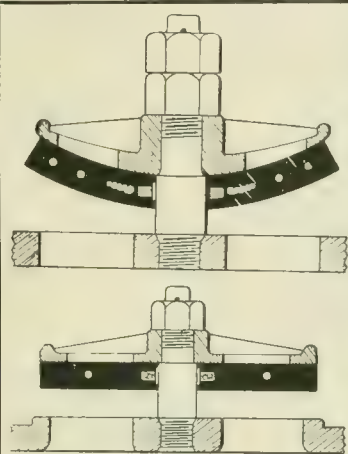
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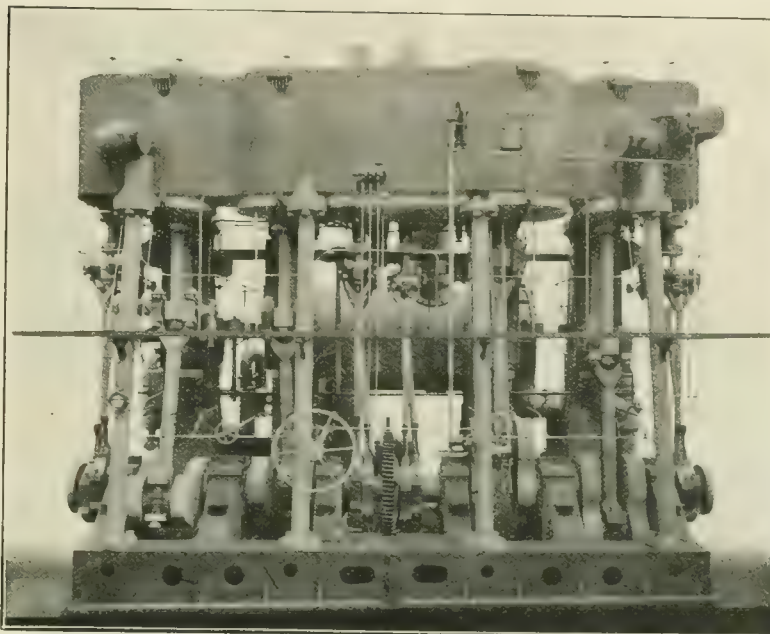
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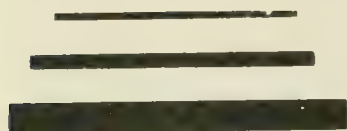
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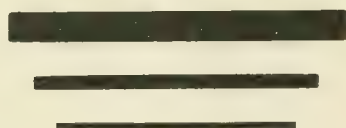
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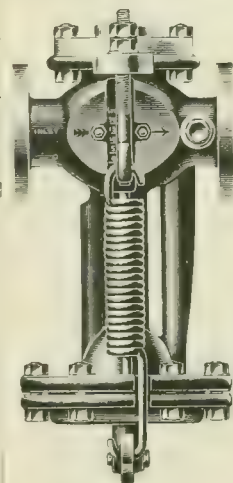
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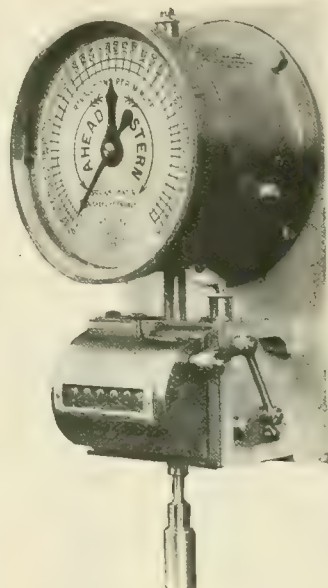
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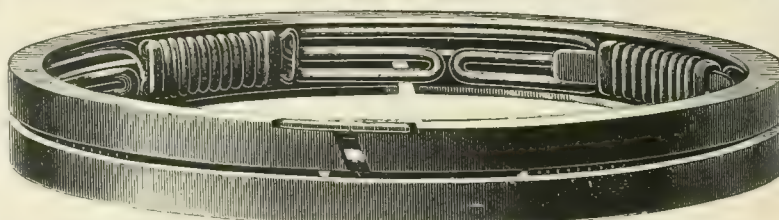
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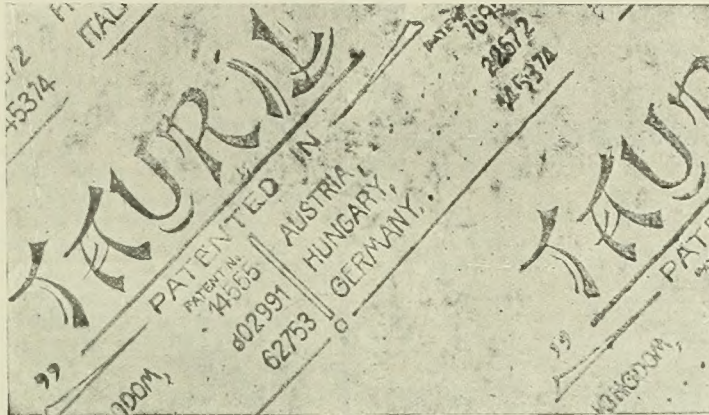
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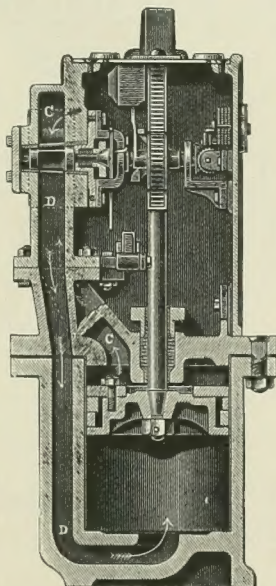
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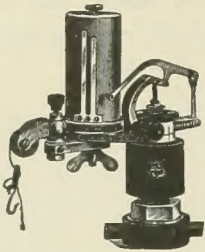
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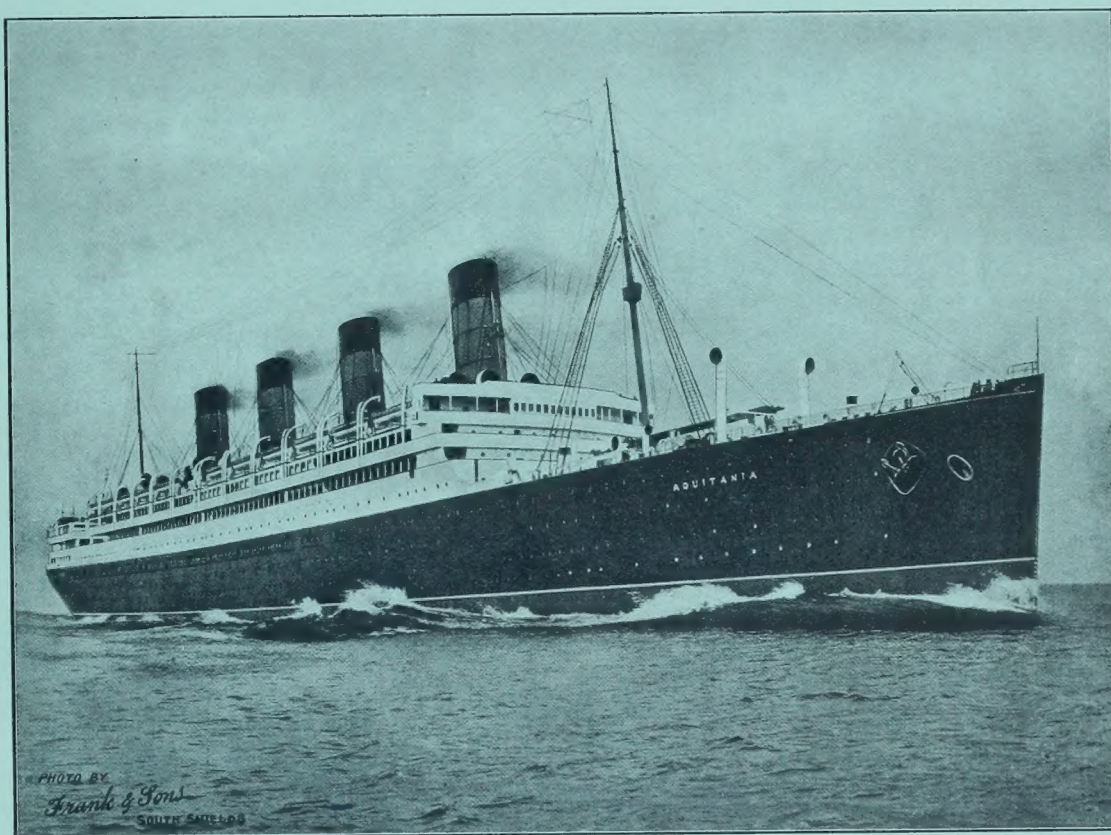
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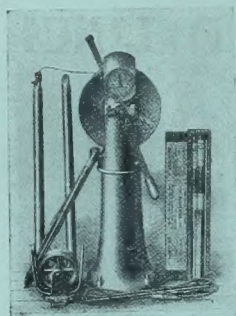
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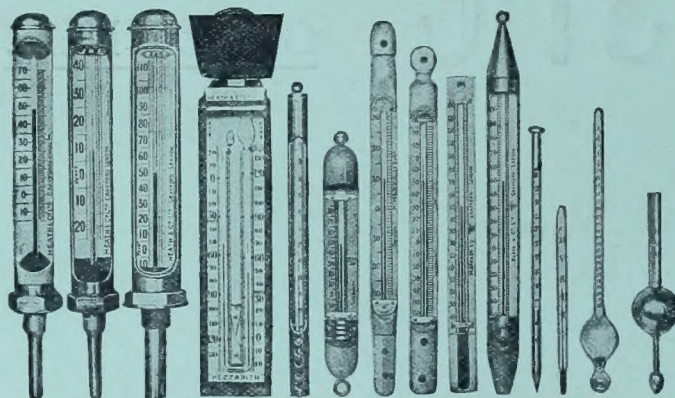
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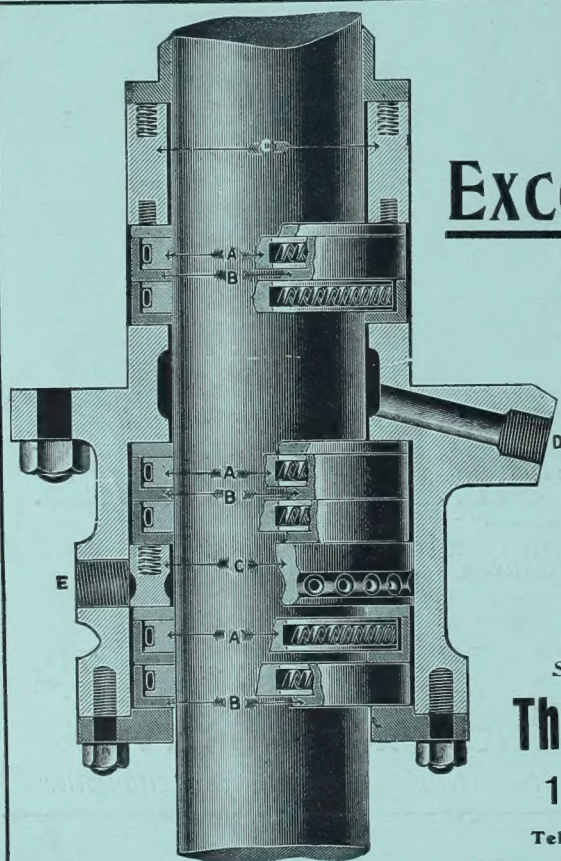
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